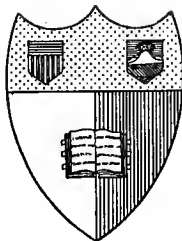


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# LEARNING BY DOING



# LEARNING BY DOING

*By*

EDGAR JAMES SWIFT

Professor of Psychology and Education in Washington University, St. Louis

Author of "Mind in the Making" and "Youth and the Race"

SECOND EDITION

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WITH INTRODUCTION

By M. V. O'SHEA

Professor of Education, The University of Wisconsin

Editor Childhood and Youth Series

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## EDITOR'S INTRODUCTION

The chief business of the child and of the youth in American life to-day is to master some portion of the knowledge and the skill which our ancestors have found of service in their experiences in the art of living; and it follows that the chief problems of the parent and the teacher have to do with helping the young to acquire this knowledge and skill in an economical and effective manner. No one in our time, who is at all familiar with the matter, can doubt that both the child and his instructor, whether he be parent or teacher, have to deal with a very complicated situation in the present-day home and school. There is a constantly increasing body of material to be learned, and the period for learning it is not being extended, so that it is becoming ever more imperative for those who instruct the young to adopt methods of procedure which will enable the novice to master what he must learn without waste of time or energy. This is, of course, an ideal which has not yet been attained in any of our educational work, as every student of education and every intelligent parent and teacher knows very well. But we are certainly making progress. We are discovering from time to time how to guide the child so that he will appropriate the more readily and competently what we believe we ought to teach him. Doubtless most of those who will read these lines have witnessed marked changes in the teaching of practically every subject in the curriculum of the elementary and the high school; and probably these changes have all been in the direction of attaining greater economy and efficiency in educational work.

## EDITOR'S INTRODUCTION

But the end is not yet; it is probable, indeed, that the principal work of improvement in teaching processes is still ahead of us. Surely there has never been a time, in any age or place, when educational curricula and methods have been studied by such precise methods as are being employed right now, both at home and abroad. It is becoming clearer every day that the whole business of teaching is so complex that the practical teacher can not solve the problems of the schoolroom, because his time and energy must be expended in doing the best he can according to the prevailing and generally accepted views of instruction. The practitioner needs the assistance of the investigator, who will delve deeply into one or another of the problems arising out of the necessity of leading the young to master a great many things in such a way that they can make use of them in bettering their adjustment to the world of people and of things environing them.

For a number of years Professor Edgar James Swift has been conducting experiments for the purpose of gaining some accurate data pertaining to the more subtle phases of the processes of acquiring certain kinds of knowledge, and mastering certain manual activities. In this work he has had a practical end in view, so that his researches have related more or less directly to the problems which the teacher encounters in giving her pupils instruction in any school subject. As a result of his investigations, Professor Swift has apparently shown that a pupil does not pursue a regular, unbroken and uniform course in the mastery of any study, but instead he seems to proceed rapidly at one period of his learning, and slowly or not at all at another period. In the present volume, Professor Swift

## EDITOR'S INTRODUCTION

describes his own experiments and those of other investigators, and he points out how the results of these inquiries may explain some of the phenomena of the class room that are often perplexing to the teacher. He also makes suggestions respecting the teaching of the various school studies which should be of assistance to all who instruct the young, in enabling them particularly to help pupils over the periods of retardation in their learning,—the “plateau periods,” as they are coming to be styled in present-day psychological literature.

Professor Swift's book is wholly constructive. It is also appreciative. He gives evidence in every chapter of his volume that he is aware of the difficulties under which the parent and teacher work, and his purpose is, first, to assist them to understand the child whom they must instruct, in respect to certain of his interests and tendencies and intellectual traits, and, second, to show what relation the learner must assume toward the things he is required to learn in order that he may gain them with as little resistance and as great efficiency as possible. All the matters treated are presented in a simple and direct, but lively style, and in non-technical language; and it may be hoped that the book will find its way into the hands of many parents and teachers, who can hardly fail to be interested in and profited by reading it.

M. V. O'SHEA.

Madison, Wisconsin.



## PREFACE

The industrial and commercial changes which have followed one another in rapid succession during the last three or four decades have brought in their wake new educational problems. As a direct outgrowth of these changes comes the insistent demand for a reorganization of our public schools that they may better fit children to meet the new conditions.

Superintendents and boards of education have tried to satisfy the new requirements by enlarging the curriculum and, in some cases, by introducing vocational guidance and training. The writer is in hearty agreement with the spirit of these changes, but he also believes that the manner of conducting the work of the school may be improved, and it is with this question, together with progress and economy in learning, that the present book is chiefly concerned. Why should the school program be separated into the subjects which the children learn by doing and those which they learn from the teacher's instruction and from books? Why could not both methods be combined? The writer is of the opinion that the principle of "learning by doing" is applicable to all the studies of the school and that it should cease to be merely an attachment to school methods, to be used in certain subjects, such as manual training, and in a few others on "laboratory days." The instruction from teacher and books should accompany or follow the achievements of the pupils in the things they are trying to do. In this way instruction assumes its proper rôle, that of putting meaning into the work in which the pupils

## PREFACE

are engaged, and of making it more intelligible. The writer has tried to show by illustrations of organized group-work how this may be done.

Another consequence of the new industrial era is the attempt to shorten the educational period preceding self-support. This early entrance into industry is likely to end by depriving children of much of their childhood, and the question is therefore pertinent whether the two aims—to conserve childhood and to prepare for the serious problems of adult life—may not be combined in an educational program that preserves the advantage of each.

The writer gratefully acknowledges his indebtedness to Miss Caroline G. Soule, of Brookline, Massachusetts, who kindly read the manuscript and made many valuable suggestions.

E. J. S.

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# LEARNING BY DOING



# LEARNING BY DOING

## CHAPTER I

### THE REVOLT FROM MONOTONY

**T**HAT was a fine appreciation of boyhood dreams and thrills which Robert Louis Stevenson showed in his *Gossip on Romance*: "Give me a highwayman," he said, "and I was full to the brim; a Jacobite would do, but the highwayman was my favorite dish. I can still hear that merry clatter of the hoofs along the moonlit lane; night and the coming of day are still related in my mind with the doings of John Rann or Jerry Abershaw; and the words 'postchaise,' the 'great North road,' 'ostler,' and 'nag,' still sound in my ears like poetry. One and all, at least, and each with his particular fancy, we read story-books in childhood, not for eloquence or character or thought, but for some quality of the brute incident. . . . Certain dank gardens cry aloud for a murder; certain old houses demand to

be haunted; certain coasts are set apart for shipwreck."

One need only look into any city back yard on almost any fine day to realize the perennial persistence of this quest for adventure. For country children life is fairly aquiver with vivid experience. Only a few weeks ago while in the country I came across a group of boys and girls—the oldest, a boy, was just past ten—decked out with feathers and carrying wooden knives for scalping the long-haired girls, and toy guns with which they were shooting two innocent little puppies who indiscreetly insisted on coming back to life. The camp-fire was a more ingenious invention than I had yet seen. It was a pile of dry brush with red flowers for fire, because the children had no matches. Such is the imagination of childhood.

Conscience and convention, often synonymous terms, will have many sins to explain away on the day of judgment, but not their least offense is unthinking condemnation of feelings and thoughts and acts which surge up in children from the stormy life of the far distant past when war and slaughter made up the usual daily routine, and pillage was but a vacation's rest from the more strenuous exertions of man's customary business engagements. Children suffer most from this assumed austerity because their lives, when passed in normal surroundings, are but day-dreams of camp-fires, forays



and scouting, with occasional tomahawking and scalping excursions thrown in for coloring.

Of course the conventional view does not refuse such sports to children when conditions are favorable, but games are not regarded as an essential element of normal growth and so are not included in the plan of education. All educators agree on the importance of childhood's freedom, so as to give the nerve centers time to mature before the strains of business life are put upon them, but the demand is insistent for rapid preparation of children for self-support. One evidence for this demand is the loud call for vocational training. Since the apprentice system passed away in the industrial reconstruction no adequate plan for combining study and work has been found to take its place. The result is increasing dissatisfaction with the length of time needed after finishing school to prepare for profitable employment.\* It is not the present purpose of the writer to argue the wisdom of this view. Changed conditions often put requirements upon us which it is useless to oppose. Vain resistance to new social and industrial demands loses time which could better be used in planning to meet the change intelligently instead of drifting. Whether we believe the claims of industry wise or not, vocational training is now a factor to be reckoned with.

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\*The writer is, of course, aware of the combination of shop and school work in certain towns and cities. But the plan has not become general enough to quiet the clamor.

If, therefore, the opinion still prevails that childhood has its rights to freedom of thought and action, the coming of vocational training gives us a new problem for solution. How may childhood be conserved in the shorter cut to self-support? This is a problem for teachers, and one of the purposes of the present chapter is to reexamine the claims of childhood to see whether a deeper knowledge of its needs may not enable us to secure aid for our work in education from the very instincts which are often thought to be in opposition to the school. If we succeed in finding such assistance we shall gain a double advantage through increasing the output of education and, at the same time, satisfying the instinctive needs of childhood.

A certain amount of leisure is needed that play may have its place, but the severe industrial life of to-day is not favorable to complete relaxation. Among men who labor by the day, if their children's help is not required to make ends meet they needs must work when school is over; and even with the well-to-do few plans are made beyond giving children the freedom of the streets. Were it necessary to argue the lack of interest in activities that make for normal growth the difficulty of securing parks and playgrounds might be mentioned. Schoolhouses, also, are built within encl-

**Purpose of this chapter**

**The discord between industry and play**

spaces hardly large enough in which to pack the children.

Children have not yet acquired the derived interests which in later life will dominate thought and action. There are few men even **Children unaffected by derived adult interests** who do not at times begin their day's work with regret. What keeps them at their tasks is desire for reputation among thinkers in their field, or standing in the business world, or habit, which will not loose its hold, if not the lower wish for money. Such derived interests as these which keep men regretfully at their work have not yet taken possession of children in school. Their thoughts and interests are those that give pleasure at the moment and to these they yield undisputed power. Their estimate of the things in which adults engage is pictured by Kenneth Grahame's rollicking youngsters: "On the whole, the existence of these Olympians [adults] seemed to be entirely void of interests, even as their movements were confined and slow, and their habits stereotyped and senseless. . . . They never set foot within fir-wood or hazel-copse, nor dreamt of the marvels hid therein. . . . They were unaware of Indians, nor recked they anything of bisons or of pirates (with pistols!), though the whole place swarmed with such portents. They cared not about exploring for robbers' caves, nor digging for hidden treasure."

Despite their sober exterior and seemingly "stereotyped and senseless habits," most of these Olympians are as ready to slip away into the enchanted land as Stevenson has so entertainingly admitted for himself. Not many adults, however, acknowledge as boldly as he does the absorbing fascination of adventures but, if one observes groups of men and women "off duty" for a week or two, books of this type, when they can be found, are working overhours. It has been the writer's privilege to pass several summers in a company of over fifty, largely college graduates, among whom were a generous proportion of college professors and secondary school-teachers. The conspicuous fact observed concerning their reading was this predominance of books of adventure. Their excuse was that these stories gave most complete rest. Doubtless this was true, but there were many other books at hand which did not put a greater strain on thought. Why does this class of books excel the others in affording rest? The popular assumption that relaxation is directly proportional to forgetfulness of all else except the story is probably not far wrong. If this is true we are again reduced to our original question: why do stories of adventure hold us closer than other sorts of books? To be specific even at the risk of seeming ungrateful to a writer who has been a solace in many a weary hour: why is Sherlock Holmes—who re-

peats his two or three stock phrases until they have become popular newspaper jokes and who is as innocent of originality as a desert is of grass—presented to us almost yearly by a new publisher? Why, again, did Mr. Doyle, after murdering Holmes, no doubt in a fit of anger at the detective's lack of originality, and after writing his memoirs, resurrect him in a third volume? There can be but one answer. The public would not let him stay dead. It looks as though Stevenson were not far wrong when he continues in his *Gossip on Romance*: "Conduct is three parts of life, they say; but I think they put it high. There is a vast deal in life and letters both which is not immoral, but simply a-moral; . . . where the interest turns, not upon what a man shall choose to do, but on how he manages to do it; not on the passionate slips and hesitations of the conscience, but on the problems of the body and of the practical intelligence, in clean, open-air adventure, the shock of arms or the diplomacy of life."

But the case for the hold which adventures have on us is not closed with the books that we read.

**The perennial zest for sports**      Why are certain games perennial? Recreation is the usual reason offered for the enjoyment of sports, but this does not explain the striking partiality for certain kinds of games. Upward of forty thousand persons regularly attend the Yale-Princeton, Harvard-Yale and Annapolis-West Point football contests, and there

have been records of nearly twice that number. A writer in the *Nineteenth Century*,\* speaking of this game, says: "Thrice during the last season the writer witnessed matches in violent snow-storms; and on one of these occasions, with snow and slush ankle deep on the ground, the downfall was so severe that a layer of more than an inch of snow accumulated on the shoulders and hats of the enthusiasts, who were packed so closely together that they could not move to disencumber themselves." Why this uninterrupted popularity for a game which has been played in England since the thirteenth century? The exciting spectacles of the Roman Circus Maximus, again, drew, at times, as many as four hundred eighty-five thousand spectators.

Recent investigations† seem to help us in understanding the partiality for certain types of games.

**Its scientific  
explanation**

Practically all of those that return as inevitably as the seasons had their counterpart among the aborigines. Handball, basketball, football, tennis, shinny and many others were played in some form by those who preceded us on this continent. There can be but one explanation of these endless games. It is the call of the race.

Let us, however, look a little further. Men will

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\* Vol. 32, p. 622.

† *Twenty-fourth Annual Report of the Bureau of American Ethnology.*

eschew comfortable homes and hotels equipped with modern conveniences to go into the woods and live in log cabins, sleeping on shelves made from branches of trees placed close enough together to prevent the occupant from falling through, without sheets, and covered with blankets that have been used, unwashed, by many an illustrious hunter; and with it all they must daub their faces with greasy tar as protection against ravenous black flies until the painted savage of darkest Africa would welcome them as friends; and this they do that they may hunt. The writer, to give another instance, has seen men fishing in the lakes of Northern Wisconsin with the mosquitoes so thick and blood-thirsty on their faces that they could only be removed by scraping with the hand. But the sport of fishing was worth it. If men will go through such torture and call it fun there must be something deep down in their nature that makes it worth the game. And that "something" seems to be the primitive instincts which civilization has been unable wholly to eradicate.

We have been speaking of men with business or professional interests to occupy their minds. What, then, is the situation with children who, as we know, have not yet acquired the derived interests that look to the future and whose thoughts and feelings are concerned with activities similar to those of early man?

In order to ascertain the opinions of adults on the intensity of their thoughts and feelings about adventures during their childhood, the author wrote to several men and women to learn their present views. All of those from whom we quote are, or have been, teachers, and their experiences of childhood, analyzed in the light of maturer thought, with help from the observation of the pupils in their schools, are especially instructive.

The following is from an unusually successful teacher who graduated from college only four or five years ago. So it can not be said, in denial of some of his strong statements, that "those times have passed."

"I sought adventures as a reaction against the monotony of boyhood. Many of my 'adventures' were mischievous acts in rebellion against too strict school discipline. Now that I have become a teacher I am interested to find that many men take especial pride in the trouble which they caused in school. I myself have never felt the slightest remorse for my conduct at that time. Why does this feeling exist? Is it not because, as adults, we see through the pretense that such acts are bad and realize that they should have been directed and utilized rather than suppressed? I had no teacher who was in the slightest degree thoughtful of the needs of boys and their wish to do things. The only person who took any interest

**An attempt to get  
adult recall of the  
child's view-point**

**Opinion of a  
young teacher**



in boy nature as it was, and appreciated our desire for adventure, was a Y. M. C. A. secretary with whom I spent two years. We boys would have died for him. All of my teachers seemed to have the idea that a boy was a sort of wild creature and the sooner he were tamed the better. And the figure may be applied further—they used many of the methods on us that are used in taming wild animals. I must admit that we boys were often mischievous under the leadership of the secretary, but the great contrast is that afterward we were genuinely sorry for what we did, while we boasted loudly of what we had done at school.

“The first and most important relation of a teacher to his pupils is that of mutual respect. A pupil very quickly learns whether a teacher really has an interest in him or whether he is simply standing as a bulwark of the law. Hearing the racial call of children for adventure has not caused all ‘troubles’ to disappear from my class room, but the different atmosphere creates a different spirit, and the ‘rebellious’ feeling does not arise. The work of the pupils has certainly improved both in quantity and quality. Boys have an irresistible desire for activity. They want to be doing something. If this desire is suppressed they are likely to break loose. Lack of sympathy for the things they want to do draws them within themselves for satisfaction. At least it was so with me, and I think that I observe the same tendency in school children to-day.”

The letter given below is so complete in its interpretations of school and village conditions that it requires no comment. The writer  
**Another** of it had charge of a country  
**reminiscence** school before entering a normal school, and after graduation, he taught for a year in a small town; then he became principal of his home school—the one with which his letter deals concerning a time when he was a pupil in it. Here he remained three years. Finally, after graduating from college he taught for several years in one of the high schools of a large city, resigning a short time ago to take charge of the sales department of a large manufacturing business. This brief biographical sketch is given to show that he has had the experiences needed to give worth to his interpretations and opinions.

“Childhood is more monotonous than adults are inclined to think because boys are usually ‘doing something,’ but the things which they do are done in an attempt to escape from monotony. The principal of the school which I attended was wise enough to see the necessity of giving us boys something to do to satisfy our demand for excitement and adventure. He put up a long ladder in the school yard, copied, of course, from a gymnasium. On another part of the ground, hanging from a tree, was a rope on which we practised climbing, hand over hand. We had wrestling matches, foot races and, of course, a baseball team.

"One winter a young woman came as assistant in the high school. She was different from the type of teacher we were used to, since, as we soon learned, it had been her custom to take walking trips during the summer vacations. We boys were, naturally, pretty skeptical about a woman doing much walking and one day several of us joked her about it in the presence of the principal. He immediately proposed that as many of the boys and girls as desired should challenge her to walk to some lumber camps, ten or fifteen miles distant, on the following Saturday. He quietly told us to have my horse and cutter ready, with one of the smaller boys to drive it, so that if necessary we could give the teacher a ride. This pleased us so much and made us so excited that we hardly slept until Saturday came. We started out early in the morning through the snow, and the teacher made good, walking the entire distance. Some of us boys would have been glad to get into the cutter had it not been for our pride, and I think that the principal himself would not have objected to a ride. It is needless to say that the teacher had us on her side from that time. The question of discipline never arose while this principal was connected with the school. There was no need for discipline. We did not know what it meant. The school simply went on with no trouble and we all worked. Few high-school boys were seen loafing on the streets and there was no drinking or smoking among us. The activities

in which we engaged under the leadership of this principal, with the encouragement of parents who understood what he was doing, took up our time so completely that there was little desire for mischief. The principal suggested many sports in which he could not participate, but he took part with us in enough of them to show that he meant what he said. My own experience, both as a pupil under him and later as teacher and principal, has taught me that this last is very important. Talking, alone, does not go very far. Boys soon get a feeling that it is done to 'work' them. That trip which the principal took with us to the lumber camps and his activity on the school grounds did more to make us feel that he was really one of us and interested in us than any amount of talking could possibly have done. The town was considered a hard one, and plenty of toughs had been produced in the school. The principals preceding the one of whom I have been speaking were complete failures in matters of discipline and one or two had been literally thrown out of the building by the boys."

The following is from a successful teacher—now the principal of a grammar school—who, since his  
**A different type of experience**      father taught before him, was brought close to the educational ideal, "brought up by hand" one might almost say, judging from the beatings he received. For these reasons his opinion of his school-days,

revised and analyzed in the light of his later experiences as a teacher, are particularly instructive. The contrast, in method and results, with the boys and principal of whom we have just read, is decidedly suggestive.

"Like most of my schoolmates, I was a healthy vigorous boy with a persistent desire for activity which was not furnished by the school or home. So we drifted into all sorts of scrapes. Many of the things we did were all right, but there was no one to encourage and guide us. On this account even the valuable activities became a source of trouble to our teachers and ourselves. For example, one of our favorite midday games was 'fox and geese,' and as that, like 'hare and hounds,' took us quite a distance from the school we were frequently tardy, and, boylike, when caught in something wrong we 'invented' excuses. Had our teachers taken an interest in our game and sometimes played it with us, I am certain we would have been saved from most of our tardiness and from all of our falsehoods. But they condemned us and looked on us as bad to the core—at least this was the opinion which we formed—though we were just normal healthy boys giving vent to our youthful spirits.

"Another game, harmless when helped along by a little sympathy and guidance, was 'Indian,' which was played on Saturday afternoons. We had our chief and we terrorized the small boys of the com-

munity, even taking them to our den—a cave a mile or more out in the woods—and there making them dance for us. One little chap who had ‘tattled’ on us several times—and here is shown another bad method of my school—we shut up in our den for the night. When he did not return to supper a search was instituted and he was found. Of course that put an end to our innocent game of ‘Indian.’ Our parents and teachers were now more than ever convinced that we were ‘bad.’

“During the time of which I am speaking I was between twelve and fourteen years of age and the desire for activity was intense. Every pond for miles around was studied by us boys and the particular qualities of each investigated, commented upon and compared with reference to their good points, and many were the whippings which I received for my clandestine enjoyment of them.

“The chief cause of our ‘adventures’ was unquestionably, as I view it to-day, the failure of those over us to furnish an outlet for the desires created by the ponds, fields and woods. Our sports were generally harmless and often educative in the beginning, but they usually ended in trouble because we were compelled to engage in them secretly on account of the disapproval of parents and teachers.”

A teacher who grew up on a farm writes:

“On looking backward it seems to me that the

greatest desire of my boyhood was for adventure.

**The experience of a country-bred teacher** This longing, which appeared shortly after ten years of age, was curbed only by natural timidity.

Later, when one of Oliver Optic's stories fell into my hands, farm and school life seemed more and more monotonous. This spirit of discontent with the slowness of life increased as I grew older.

"Since this desire for something unusual to break the monotony was unappreciated by those over us, who, apparently, had forgot their own youth, I and my associates tried to find our own ways of relieving the depression. Sometimes these acts were harmless and at other times almost criminal, but they were always unguided and, in fact, condemned. On one occasion we nearly burned a boy at the stake and probably would have done so before we were aware of the danger had not a neighbor come upon us just as we were applying the match to a pile of hay and dry twigs in the midst of which our captive was tied.

"Drawn together by the common bond of loneliness we put into execution all of our venturesome plans. The worst series of acts was incited by a book of the adventures of robbers. We read it together and straightway resolved to become truly great in that line. That winter everything went wrong at the school. There were many offenses, all directed against school property, and finally,

when the outhouses were burned, the school directors were in a frenzy.

"As I look back over it all, with a wider knowledge of boys from my experience as a teacher, I am convinced that we could have been controlled and our farm and school work could have had real interest had our teachers, appreciating what was going on within us, furnished vigorous, healthy outlets for our boyish spirits and directed them by joining in enough of our sports to show that they were more interested in us personally than in school studies and discipline, the importance of which we did not, and at our age could not, understand."

But this desire for adventure is not limited to boys; the principals of a girls' boarding school have informed the writer that it is one of the things which they must keep in mind. Girls, they say, are like boys in being depressed by unbroken routine. "Monotony bores children and a bored child is not efficient." They add, however, that although nothing sensational is required to relieve the monotony, if they do not relieve it something sensational is certain to happen. An outing in the woods, when the weather permits, an occasional supper at a hotel, and other equally simple devices meet the needs. "One great value of dramatic performances in school," according to these teachers, "is the relief of the children from their own stale and limited habits of thought and feeling."



As evidence that startling adventures are demanded by boys quite as little as by girls, a high-school principal recently told the **Simple methods of reformation** writer that two of his most troublesome boys were "reformed" by a very simple method. One was a good musician, and it was suggested to him to organize a mandolin club; the other was advised to try for the football team, which he succeeded in making. Both were told a little later that they must show themselves worthy of the responsibility, and they did.

The superintendent of a hospital and training school for nurses says that this same longing for occasional "adventures" must be reckoned with in her apprentices, though these girls are older than those of whom we have been speaking. Certain things are overlooked and charged to the account of this desire to break the dead level of routine. In the hospital, however, the superintendent adds, the patients often furnish enough excitement to meet the needs.

A woman who has had a varied experience with girls writes: "Among the grammar and high-school girls whom I have known, perhaps nine out of ten have given unmistakable evidence of a feeling of monotony in their lives, and especially of being bored by the educational process." This monotony, in the opinion of this **Connection between monotony and popular amusements**

woman, furnishes the explanation for the popularity of moving-picture shows, sensational novels and, among certain classes, the public dance-halls. "All of these manias come directly or indirectly from the instinct for action and experience. . . . There is a time when every girl longs for free, wild, daring physical action, a time when every girl wishes in the bitterness of her soul that she were a boy, but not in disloyalty to her sex. Consciously or unconsciously, it is her nature crying out for freedom and action.

"The schools should include activities demanding action, responsibility and originality. Otherwise the **Need of real action in schools** rate at which commercialism is multiplying the passive sensations is, for girls especially, most alarming." The proprietors of five and ten cent theaters and moving-picture shows have discovered that there is a demand for "passive sensations" and for what this correspondent calls "action-by-proxy." "The sensational novel mania is also at bottom a desire to escape from the sameness of environment. If girls are denied opportunity to be themselves the actors they are bound to seek substitutes, and the more realistic these substitutes are the better they fill the vacancy. It is the law of compensation."

These are only a few of the many instances which could be given did space permit. They are more than individual cases, for in one of these letters we have seen a school transformed by a prin-

**Contrasting school methods; their results**

cial who understood the function of adventures in the economy of children's growth. It is no small matter to take charge of a school in which the large boys boast of putting the teacher out-of-doors and win them to one's support. Still more significant is it when, in addition, one reorganizes the community, changes the thoughts and feelings of the children and transforms disorder into interest in study and in the school. This kind of a school has been placed by the side of another in which the same sort of "adventures" led to trouble because they were done secretly to escape the disapproval of parents and teachers who had forgot the thoughts and impulses of their own childhood. In the one school the native instinct for excitement, for contest of muscle and brain in "the shock of arms" and in the "diplomacy of life," in short, for adventure, was utilized for mental and moral growth; and in the other, the same impulses were left to function in the old anti-social way, to set up resistances to discipline and study which the teacher must overcome and, perhaps in the end, to lead to the reform school and prison. And here let us say in passing that there is no separate criminal class. As William Pinkerton has said, "Criminals are just like other folks."\* Since Mr. Pinkerton has spent more than fifty years in constant association with crime and criminals, he can not be accused of visionary ideas.

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\* *The Hampton Magazine*, Vol. 28, p. 267.

Al Jennings, the reformed leader of the once famous "Jennings Gang" of train robbers and bandits,

**View of a reformed bandit** has expressed the same opinion regarding criminals and, incidentally, has shown the part that love for adventure may play in crime. "It is my firm conviction now that heredity counts little and environment much in making a criminal. Before I go on with the rest I had better tell just how I felt about my old trade (of robbery). My bitter hatred of the world had dwindled a little and a love for the excitement and adventure in the game had grown up. I liked the plotting, the taste of danger, the thrill of escapes. I liked the half-savage outdoor life. And I wove imaginations about myself, pictured myself as a romantic figure."\*

The most fertile environment for making criminals is a town or school where primitive instincts

**Necessity of control of racial instincts** are allowed to run their course unguided. Repression is almost as bad as allowing these instincts

full freedom, for then they are put in opposition to the work that growth requires, and craftiness is developed to outwit those who seek to still the impulses of the race, so dominant in youth. Exciting adventures, as adults understand the word, are not needed. Children are imaginative and they think excitement into simple matters if they but have the chance to exercise freely their native instinct to

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\* *Saturday Evening Post*, Sept. 20, 1913.

execute their own plans in competition with one another.

Besides athletics and games of various sorts, certain studies of the school easily lend themselves to this active treatment. Geography, nature study, zoology and botany are instances in point.

**Suggestions concerning teaching of natural sciences**

These subjects have been made too bookish. Geography still consists largely in locating, bounding, describing and defining, always from the book, instead of using the streams and swamps and other outdoor sources of geographical knowledge which often lie at the school-yard gate.

The report of the committee in charge of the survey of School District No. 1, City of Portland (Oregon), says, with reference to geography in the schools under investigation: "No connection was made or suggested between the book statements and the pupils' own immediate observations of geographic phenomena; not the slightest stimulus was given to observe, to think about, and to interpret the geographic phenomena in which Portland and vicinity surpassingly abound; even an exercise in 'home' geography was conducted entirely from the book. . . ." In Vermont much the same condition was noted by the investigators for the Carnegie Foundation: "History and geography are not made to appeal to the children by connecting these subjects with their experiences. The lessons that were observed

**Memorizing versus thinking**

in these subjects were confined largely to a repetition of the contents of some text-book, and there was seldom any effort to relate the statements of the book with what the child might be expected to know about his own environment." Unfortunately, this method is too common. The most recent of the many instances of which the writer has learned was reported to him as this book was going through the press. The sister of a boy in the fifth grade of a Missouri school was helping him in geography. The child defined erosion correctly. Since there were excellent examples visible from the house, as it was raining hard, his sister asked him to point out an illustration. The boy looked blankly through the window for a few minutes and then said, "I can't do that, but I can tell you of one in Colorado."

For zoology and kindred subjects nature has been catalogued and dried, and the schoolmaster vainly strives to squeeze some interest from the desiccated remains, though Huxley, long ago, showed how green scum from the nearest gutter, a handful of weeds from a pond, a frog and a pigeon, instead of books, may be made the final authority. Meanwhile, also, the birds that have not yet reached the museum stage of ghostly unreality are calling the children to their woodland homes to study their lives and habits. It can not be said that material is lacking for this out-of-door work since, in addition to the animals themselves, state agricultural

stations and several bureaus in Washington are ready to supply a wealth of interesting information about the habits of the denizens of the woods.

Out-of-door work in nature's laboratory would give the children live problems for solution instead of dead ones. The pupils would **How to prevent imitative thinking** learn to investigate—to put questions to themselves and to find the answers. Readiness to see problems in what confronts one, to state conditions clearly, with emphasis on the essentials, to see the questions involved in these conditions, underlie thinking; and this power is not gained by sitting in one's seat and reading what others have said about these things. Books in the schoolroom should be used to verify answers which have been obtained by observation and investigation, and if differences of opinion among authorities are found the enthusiasm of the children for personal investigation is greatly enhanced. Studying what writers say, with laboratory work to establish its correctness, is the imitative method. It does not train in thinking; and failure to learn to think is failure in education. An illustration of the disastrous effect of imitation through slavishness to books has just been reported to the writer by a high-school teacher. The children in his first year German class can accurately define each tense, but they can neither give examples nor recognize any tense beyond the present.

In what does thinking consist? Without attempt-

ing to answer this fully at the present time, because

**Prerequisites to thinking** it will be discussed later, the prerequisite of thinking is ability to see a problem—to state it clearly. With this, of course, if results are to be obtained, there must be a continuously aggressive desire to grapple with the solution of such problems as arise in the course of one's work. Both of these mental characteristics are largely matters of habit. Every one is capable of much clearer thinking than he actually does. Therefore, to the extent to which the brain of individual children permits progress, the teacher's problem is to train them in habits of thought, and in doing this, as in the case of all habits that are in opposition to racial indolence, the emotional attitude of the pupils is of incalculable importance. For this reason desirable habits should grow out of those instincts which clamor for action, since they have the firmest hold on youth.

A good deal has been written about awakening the interest of pupils, but the method is usually

**The source of interest** so transparent that the children are disillusioned by seeing the wheels go around. That which is to be taught is considered as something apart from the pupils, for which their interest must be aroused by entertaining devices of various kinds. Interest, however, is in the children and can only be awakened by making their instincts the starting-point. The facts to be learned and the problems to be solved are then



reached in the natural course of their efforts to accomplish what they have set before themselves and which they have undertaken because it appealed to their instinct of mental or manual workmanship. Interest is the emotional condition that arises in an individual through gratification of nascent tendencies. In adults these tendencies may be of the derived sort—the outgrowth of reading or of business or professional needs—but in children they are of racial origin.

Life is always accompanied by activity and it is for the teacher to discover the object or purpose of this activity in his pupils so that the ways and means of the school may not do it violence. Children are never inert, physically or mentally. They are in a constant state of suppressed or expressed action, and when these spontaneous impulses are repressed explosions are imminent. No absolute value can be ascribed to method and means of education. Their worth is relative to the thoughts and feelings of the pupils. Interest is exasperatingly fastidious; it selects that which makes an appeal to the thoughts and feeling from which it springs. The hopeful thing about children is that they always want to do something, and the successful teacher ascertains what they want and helps them to do it in an educative way. This is not yielding to their whims. It is building on the content of their minds, a method long accepted, theoretically, as good pedagogical

**Activity a constant factor in mental growth**

doctrine. The teacher's skill, then, reveals itself, among other ways, in discovering the thoughts and feelings of his pupils and in satisfying them without sacrificing the purpose of education.

When children are inactive they are in a condition of unstable equilibrium, ready to fall into **Inactivity a state of instability** the first constructive or destructive adventure that is suggested. "Let's play," cried one of the youngsters in a group observed by the investigators of the Kansas City recreation survey. "Well, what shall we play?" was the reply of the others, and the injury to property in town and village, and the police and juvenile court records of cities give the answer to this question.

Now the one impressive, overwhelming fact mentioned by all of the recent recreation surveys is the **Reports of recreation surveys** large number of children who were doing nothing at the time when the "flash-light" observation was taken. They were like a crowd awaiting the call to deeds of heroism or destruction. In Milwaukee the number of idlers was one and one-half times those playing; in Detroit, Cleveland, Providence and Kansas City upward of fifty per cent. or more. In all of the cities surveyed a large proportion of those reported as playing were engaged in fighting, teasing, shooting craps, pitching pennies, or in some other more or less demoralizing sport. "The need is outlet—outlet for individual energy and for group

activity," is the way in which the report of the New York People's Institute diagnoses the condition; "outlet for the adventurous interests of boys—other than a destructive outlet." "Mischief," says the Milwaukee report, "which is technically called in the courts 'juvenile delinquency,' and lack of initiative, which is called in the schools 'dull stupidity,' are the sure results of doing nothing." And, again, according to the Providence report, "Doing nothing almost inevitably leads to the wrong kind of outlet for the spirit of youth." In speaking of crimes incidental to the games of the New York City children, the report of the People's Institute says: "The elements the boys are striving for are the dramatic adventures in obtaining stolen goods, the excitement of gambling, which to them is no crime, and the physical joys of soda-water, cigarettes, moving-picture shows, etc., which follow the game. These boys start out to seek adventure, excitement and a 'treat.'"

When we ask how instincts may be utilized for education the method is plainly indicated by their

**A guide to utilizing instincts**      ceaseless employment in manipulating the little world in which the children live. Knowledge of instinctive tendencies will enable a teacher to suggest situations of action in the course of which educative problems arise. After all, what is desired in teaching is that the pupils study and think and acquire habits of industry. The method that best accomplishes this

is the one to follow. If children work vigorously when organized to carry out plans that appeal to their native instincts the result in acquisition of knowledge and in training is not less valuable because the children study willingly and find pleasure in what they are doing. It is obvious that adventures in the real sense of the word may sometimes be freighted with educational problems, but all activities which the pupils manage, share in the spirit of adventure and to that extent break the monotony of routine work and satisfy their need for action.

In an investigation of the truant schools of Boston the writer found boys who had run away from other schools waiting at the door a full half-hour before the teacher came. When asked the reason, the teacher smiled and said she thought it was because they were allowed to think and act instead of imitating the thoughts and actions of those who believed they knew a better way. The same question has recently been put by Philip Davis, director of the Boston Civic Service House, and he finds the answer to be that the ideal truant school "pays closer attention to the interests, activities, feelings and emotions of the child—because, in short, it has organized a school-life, the keynote of which is action rather than studies."\* This does not mean that studies are to be neglected. They are not neglected in the Boston Truant Schools. The differ-

**Reasons for successful truant schools**

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\* *Boston Transcript*, Aug. 16, 1913.

ence lies in the way in which they are studied, whether in a manner that gives the children freedom to think, originate, investigate and act, or in the imitative way of "learning lessons."

We have found that this same spontaneity on the part of children is aroused by heeding racial calls of various sorts. At bottom, **Transference of enthusiasm** though, these instincts are the same—the tendency to contrive with mind or hand and then to do what one has thought. If it is the instincts usually associated with primitive man that receive attention, as in sports and handicrafts, the enthusiasm awakened may be transferred to other work, to the studies of the school, because the children then have fellowship with the teacher. He has met their needs and they respond.

It is not in quantity of knowledge that children chiefly differ from adults. The stuff from which their thoughts and feelings are made is **Difference in mind content of children and adults** different. Widely varying experience cuts away the common ground of understanding. Men of different nationalities can not get one another's points of view. It is no wonder, then, that children, having had none of the experiences of adults, regard them as a peculiar people with strange ideas who are always urging conduct and habits and studies in which the youngsters see no value. "To them (the children) the inhabited world is composed of the two main divisions: children and upgrown people; the latter

in no way superior to the former—only hopelessly different.”\*

Why should children be expected to understand the importance of knowledge when the need for it has not yet arisen? One of the problems of the teacher is to produce situations in which this need will be a recurring factor, and the conditions that meet this educational requirement are those in which the children are the planners and the workers. In short, they are situations of action.

Before this cooperative planning can be effective, however, it is necessary to bridge the chasm that

Instincts as start-  
ing-point for  
interest

separates the thoughts and feelings of children from those of the teacher. When one looks over

the field for teachers in schools and social organizations who have won the interest of their children, one invariably finds that the method used took account of racial instincts. The “adventures,” as we have called these activities for want of a better name, have supplied a motive for situations out of which a consciously felt need for knowledge grew. The children took an interest in the problems because they arose in the progress of what they were trying to do; and they wanted to do the things because they gave opportunity for action, for planning and for managing. There is no artifice about this. It is simply starting from the racial heritage which children have in common.

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\* Kenneth Grahame's *Golden Age*.

This open relationship between teacher and pupil, besides connecting with the studies of the school, prevents the feelings and emotions from "striking in" and making the children withdraw within themselves. Emotions to be healthy must be expressed in action. They are certain to find some exit, and when free action is suppressed they are likely to find their satisfaction in secret ways that develop unhealthy motives for thought and will.

**Importance of action for healthy emotions**

When once this frank agreement on mutual interests has been reached, the skilful teacher may lead his pupils where he wishes. The Unlimited opportunity for teachers gulf between mature and immature thoughts and feelings has been spanned, and now the interests of the pupils can be broadened. Perhaps it was knowledge of this fact that led Paddy Byrne to regale Oliver Goldsmith with stories of adventures, smugglers, robbers and pirates as a preliminary to something else. At any rate he succeeded after Dame Delap had called Oliver the dull-est boy she had ever tried to teach.

**Unlimited opportunity for teachers**

"Adventures," however, have a value beyond their service in arousing enthusiasm for the studies of the school. They afford an understanding of human actions which can not be learned in books, and those who have not had them in their boyhood are later at a disadvantage in dealing with men. "I had a boy's love for adventure," writes a young busi-

**Experience in terms of adventure**

ness man, "but the spirit to do things was so suppressed that it had to satisfy itself with visionary dreams rather than in those natural activities to which it should have been directed. My parents fitted up a fine workshop, which I never used except under protest, and bought squirrels, dogs and, finally, a saddle pony. These gave me pleasure, but they did not make up for the experiences which every boy craves and should have. My teachers were entirely unconscious of my boyish thoughts and enthusiasm. They gave me no encouragement to engage in even school athletics. Any summary of my boyhood experiences can only be a confession of a life of continued monotony, and I believe that in consequence of this lack of adventures my initiative, resourcefulness, self-reliance and the ability to be a good 'mixer' and judge of men have been permanently impaired." Compare this last statement with that of another business man who writes: "Some of the things which I did in the spirit of adventure are of more advantage to me to-day in business than anything I learned in school."

Education is more than schooling. It calls for the development of all the latent powers of childhood, and the primitive instincts  
**Conclusion** are among the resources at the disposal of the teacher. By utilizing them they become allies for promoting growth, instead of obstacles to be overcome, and the enthusiasm created by their recognition as springs of action in the young



gives a zest to work that makes it pleasant, though not easy. We shall endeavor to indicate some of the ways in which teachers have combined the spirit of adventure with the work of the school, but first it is important to consider certain characteristics of efficient teaching.

## CHAPTER II

### EFFICIENT TEACHING

**W**E have been told that the education of a child should begin with his grandparents. Yes, that is true, only it is with the grandparents of the future children that we must start—with the children who are in school now. The difficulty in falling back on heredity is not our ignorance of its laws. Investigations are daily making those clearer. The trouble is in deciding what makes an efficient man or woman. Of course certain things are clear enough. We know, for example, that honesty, industry and perseverance are essential, but many men possess all these and yet lack efficiency. Human efficiency is too complex to be defined in such limited terms.

Educating men is an altogether different proposition from training animals. In the case of dogs, for instance, we know exactly what we want. If it is a certain kind of hunting dog which we are after, we obtain an animal whose ancestors through many generations have been accustomed to do what

Difficulty of defining human efficiency

Difference between human and animal educability

we want done and train him vigorously in the acts required for success. Police dogs are another illustration. Their new work differs only moderately from the things in which their ancestors were proficient. But if this principle had been followed would Robert Browning have been selected in advance for the work in which he so splendidly excelled? Browning is not an isolated case. Read the lives of the ancestors of men and women who have achieved fame, and see how many of these eminent persons you would have selected in their childhood for success in their later work. Some of these ancestors will not stand investigation. Then, too, the children of eminent men and women are often disappointingly inefficient.

It is not the purpose of this chapter to oppose the principle of eugenics. Mutations, however, are **First essential of efficient teaching** probably no less common in human beings than among the lower animals, and "sports," which are only isolated cases of mutations, are sufficiently numerous among geniuses to attract attention. Perhaps the frequency of sports is the cause of much which has been written about genius and insanity. We know now, as the result of Burbank's work, that the first condition of variability is the breaking up of specific habits. When this state of instability has been attained new variations may be expected and then if conditions are favorable for a definite kind of variation that particular change is likely to occur. Encourag-

ing variations and recognizing them when they occur is, in the opinion of the writer, the first essential of efficient teaching. Let us inquire a little more definitely into the meaning of this.

It is, of course, admitted that we must take children as they are. Complaint that they were not born right avails nothing. They are the raw material which must be worked up by the schools. Now there are at least two widely different ways of approaching our task. We may decide just what sort of men and women we would like to make out of them and then regulate their "going and coming" by assignments of work, by rules and prohibitions with a view to developing our ideal type of adults. Or, again, instead of settling at the start the kind of men and women we will make our pupils into, we may supply incentives for the development of various sorts of ability. To illustrate our point somewhat roughly, if we were to rear a strange animal with whose habits of eating we were unacquainted, we should scatter various kinds of food before it to learn which it would select. This, indeed, is exactly our method when we read aloud to children from different books, taking care to stop each time at some interesting place to see which book is sufficiently absorbing for them to wish to continue it by themselves.

I am aware that one rarely adopts the first meth-

od as consciously as did Austin Feverel for his son Richard. Our ideals are usually acquired unconsciously and our actions are made to fit them with quite as little deliberate intention. The instruction which we have received in preparation for our work, the ideas of discipline acquired, the pressure of the community, or, still more often, perhaps, the line of least resistance, draw us unconsciously to the adoption of the first method as a plan of action. But, besides the fact that there are many ways of being efficient, this method ignores the individual traits of children, and it does not draw out their abilities because it makes no appeal to their inherited and acquired characteristics.

Children must, of course, be held to certain requirements. They should be punctual, studious and orderly. There are, however, many ways in which these qualities may be taught. To command that they be observed, with punishment for failure, is the simplest—and the most primitive—plan of action. Whether its results be good or bad depends upon the natures of the children to whom it is applied. The best that can be said for this method is that it is successful for those who are suited to it. As far as this statement has any meaning at all, it repeats what has already been said: i. e., that the efficient method is the one adapted to the individual traits

of children. I admit that this view throws aside all rules of action in the schoolroom, and leaves the solution of the problem to the teacher's interpretation of the individual peculiarities of his different pupils. But this is as it should be. The only rule that can be given is to follow no rule. To be even more paradoxical, probably the safest way to attain this state of freedom is through rules. This is true at least for those who are versatile enough to prevent a method from becoming habitual, for it is a great advantage to have experienced the failure of the rule-of-thumb plan of "teaching school." One is then prepared to appreciate the difference between the output of mechanically directed study and spontaneous diligence. It is the same with the method of the recitation. The first thing to do is to get a method and the second is to discard it. A teacher, for example, is unfortunate not to have been caught by some of the many systems of teaching arithmetic, but it would be fatal to his own progress and that of his pupils to be held by them.

Rules are intended for the preliminary stage when one is learning to judge situations. As a **An illustration of** matter of fact, no two situations **good judgment** are exactly alike and intelligence is displayed in distinguishing essential differences from the non-essential and in modifying one's acts accordingly. An illustration from an actual school occurrence will make this clear. A teacher in a

country school was accustomed to keep her red sweater in the cloak-room of the building for use on cold days. One morning on arriving at the building she found that it had been hung from the middle of the ceiling of the schoolroom. In addition to this ornamentation the top of the clock was decorated with a pair of shoes kept at the school by one of the girls who was obliged to travel a wet, muddy road. The teacher paid no attention to either and everything went on as usual. At recess the janitor asked her in the presence of several boys if he should take them down. "Oh, no," was the reply, "the children like to have them there and they do no harm."

A classical example of this same adaptation to the situation is found in an anecdote of Frederick the Great. After his exhaustive wars he felt obliged to introduce a severe and unpopular system of collecting taxes. His tax-gatherers searched private houses so diligently that the people called them cellar-rats. One day, while riding through Berlin, Frederick came upon a crowd of people looking at a picture high up on a wall. As he came near, he saw that it was a caricature of himself, as a miser, grinding coffee. "Hang it lower," he cried to his groom, "so that the people need not break their necks looking at it." Immediately a cheer burst from the crowd and the picture was torn into a thousand pieces.

The illustrations which we have given show how the response may be made to fit a situation and the desired result be thereby attained. The principle, however, applies also to the varying ways in which different pupils should be dealt with to obtain the best of which they are capable. This may be shown by an instance reported to the writer—the not infrequent case of a solitary boy in the senior class of a high school. He became discouraged because the girls made better grades than he. By observing him, and through conversation, his teacher found that he had no confidence in his ability. Finally, he decided to withdraw from school, and then his teacher, having induced him to stay a little longer, decided to try a different method with him from the one she thought advantageous to the other members of the class. She had discovered that he was fond of writing poetry, so she asked the entire class to write sonnets for the following day. As she had expected, Frank's poem was much better than any of the others and he became quite a hero in the class. This increased his self-respect so much that he began to study with renewed vigor. He had found that he could do at least one thing better than his classmates. In a few days the other members of the class returned to the work which seemed more profitable for them and Frank became the poet. He studied the various kinds of verse and read about authors until finally,

**Application of  
principle to  
teacher adapta-  
bility**



as usually happens under skilful guidance, his interest spread to prose literature as well and, as his teacher puts it in her letter, "he became a live wire in the literature class."

Another instance, illustrating the same principle in a different way, was shown in the treatment of **Another illustration from a school** a boy in the first year class of a high school. He saw "no good" in any of his studies. He was going to be a farmer, he said, and what was the good of all "those things"? His teacher discovered one subject which he did not exactly "hate" and that was the composition part of English grammar, and he also wrote fairly well. So she suggested that he be appointed "reporter" for the school. It was his duty to go around to the different rooms each week and gather items which he arranged and edited for the town paper. This constituted a part of his class work. He soon found that a knowledge of the technical parts of grammar was of advantage in his writing and so his narrow interest widened. Before long he saw that information about other things than grammar was needed for an "editor." Interesting experiments in the laboratories, facts about earlier investigators and their work, and many other bits of knowledge came to his attention and aroused his curiosity beyond their use for the items in the village paper. As a result his interest spread to all the studies of the school, because, at last, he saw their use. To return, now, for a

moment to the paradoxical statement above that the best rule for the teacher to follow is to have no rule, the writer ventures to ask what rule could have been given for guidance in these instances beyond saying that the individual peculiarities of each child should determine the plan to follow? This, of course, makes every pupil a special "case" requiring a different rule of action.

It would be a mistake, however, to assume that this view reduces education to the vagaries of lawless caprice. The practice of medicine did not become a science until physicians saw that the same outward manifestation might be caused by widely different organic or functional disorders. As long as fever, for example, was regarded as a specific disease requiring one definite sort of treatment, little progress in medicine could be made. To-day, when different prescriptions are given for "fever," we do not say that the practice of medicine is governed by no law. The recognition of various causes for this symptom of internal disorders marked the beginning of law in the treatment of diseases; and it is the same in education. If the teacher is not always treating a mind diseased he is, at any rate, dealing with minds affected by bodily and mental conditions which cause the "peculiarities" that make the trouble. Constant suspicion of kindly acts, for example, may be caused by the treatment received

**Flexibility of  
method is not  
caprice**

at home or by a misunderstanding of the teacher's motives, and persistent annoyance by a pupil may be due to either of these or many other causes. Indolence, again, is often traced to bodily condition, such as eye-strain, but quite as frequently to interests of which the school takes no account. These are a few of the many examples which might be given to illustrate what is meant. It is obvious that always to apply the same treatment to "indolence" would be a professional blunder quite comparable with the "criminal carelessness" which sometimes brings physicians before a court of justice.

We have been trying to show the need of discovering the causes of failure to respond to opportunities for learning and for doing, as well as to urge the right of every child to have his type of mind considered in his teaching. It was the latter that prompted Voltaire to exclaim, with his characteristic vividness, "Everybody must jump after his own fashion." These guiding principles—to find the cause of failure and to deal with individual personalities, instead of with the abstract child—are the beginning of efficient teaching. As for the rest, the method followed should be directed toward fixing habits of behavior and of clear thinking; and here we come upon a significant educational fact.

**Two guiding principles in efficient teaching**

Children are the most adaptive creatures in the world. They are more clever at adaptation than any of the lower animals because they have more intelligence. If a teacher varies his requirements for the same children in different classes, being lax in one and adhering rigorously to his demands in the other, the children will adapt themselves quite contentedly to the contradictory situations. It is a common experience, for example, to have the same pupils careful of their spelling in papers for the spelling class and neat as well as thoughtful of the English in their compositions but careless of all three in arithmetic and geography. Adaptation is fitting into requirements, and the "fitting" is usually done with the most economical expenditure of energy. Economy of effort requires intelligence and that is the reason why children are so proficient in it. One of the advantages that goes with being man instead of dog is ability to economize effort; and we can not blame children for enjoying one of the prerogatives of their genus.

Pupils do not usually make these adaptations consciously. It is the line of least resistance that is followed. For, as Rousseau long ago remarked, not even children wish to take unnecessary trouble. On this account, if more effort is needed to evade tasks than to do them

**Connection between adaptation and economy of effort**

**Connection between unconscious adaptation and bad habits**

the work will be done. And so penalties are imposed in the effort to increase the difficulties of escaping work. Unfortunately, however, by the time the teacher has decided to inflict the penalty the children have already made their adaptation to a lower degree of efficiency. As a result of this delay the situation is greatly complicated. It is now not merely a question of promoting adaptation but of breaking up bad habits and forcing readaptations to a new requirement. And that is much harder to accomplish.

The cause of much of the difficulty in securing good habits of work in school is that the requirements are irregularly and intermittently enforced. To-day they are kindly but severely insisted on and to-morrow the demand is relaxed. So the children are kept in uncertainty about what is expected. They do not know to what they should adapt themselves, and desiring, as we have said, to go to no unnecessary trouble, they do not adapt themselves to any definite requirement. In other words, they drift into indolence. The statement that children do not wish to go to unnecessary trouble seems to imply deliberate action. This frugality of effort, however, is largely physiological. It is economy in organic action. Nature is rarely extravagant in her expenditure of energy.

Sentimentality, again, has replaced the stern dis-

cipline of former days and in the attempt to make work pleasant it is often made too easy, though the two terms are by no means synonymous. Consequently, the children adapt themselves to a comfortable, effortless mode of study which brings, at best, only a confused conglomeration of facts. But suddenly the teacher awakens to the fact that his pupils are merely committing their lessons to memory and doing even that indifferently. Therefore, being a conscientious teacher, he tries to enforce a little real thinking. But now the tables are turned. For the difficulties in the way of reversing the children's habits of work are almost insurmountable and, after days of fruitless effort, the teacher yields to the inevitable and adapts himself to their requirements instead of making them meet his.

The trouble lies in not starting right. Adaptation is an unvarying law of nature. It is certain to occur. The question then is to what conditions shall the adaptation be made? If teachers begin their year's work with certain requirements, kindly but firmly enforced, the pupils will adapt themselves to the demands; but there must be no relaxation in the requirements until the adaptation becomes a habit. For this reason it is of the greatest importance that the program of action be carefully thought out. Only requirements essential to success in the daily work should be made. The children are in

school to study and to think, and certain conditions are necessary. Rules not vital to the work in hand are sometimes given. They were made in a moment of irritation at interruption and were never intended for serious enforcement. An illustration will make this clear. A teacher is busy with a class and one of the children at study crosses the room to get a ruler. The teacher is disturbed and says at once that no one may leave his seat without permission. He does not mean it, or would not did he but think, for he does not wish pupils to sit idle for want of a ruler or a pencil which might be obtained easily and quickly, nor does he desire many requests for permission to do what might be done with less disturbance by saying nothing. Therefore he does not enforce the rule.

The fewer rules laid down the better, but those which are made should be vital to the work and no exception should ever be permitted. Then the children will adapt themselves to the requirements. It is an old story that a colt which has run away once is rarely altogether safe. Adaptation to bit and rein has been disturbed and an opposing habit started. And so it is with children, though here resistance to the adaptation, when once a break occurs, is even greater because they are more conscious of their possibilities.

All habits are adaptations, and the habit of discriminative thinking is no exception. Children will

**A test of habits of thinking**      use their knowledge to verify or deny new statements if they have been trained to do so from the beginning. Otherwise they will not, because selective thinking requires effort which they will not needlessly expend. Accepting each statement, even those contradictory to facts already learned or meaningless, is much easier. The principal of a large public school told the writer that he became convinced that the children were not paying attention to what the teacher said, or taking interest enough in it to understand the instruction. So he planned a test, first warning the teachers lest their faces betray him. He went into each room of the eight grades, except the first, and gave a short talk ending with: "Now I want each one of you to promise to sagitate your constitution every week."

As he expected, not a hand was raised for permission to ask a question, until he reached the seventh grade, when one boy's hand flew up. The principal thought that he was caught this time, but when he gave permission to speak, the boy, with the air of consciousness that he always did the right thing, said: "I did mine yesterday." When the writer repeated this to a class of teachers not long ago, one of the members doubted whether his pupils could be deceived so easily. They were taught to think, he said. He consented, however, to make the test, and the following week admitted with some chagrin that "it worked."



Children can be trained to think provided the conditions to which adaptation is enforced require **More about training in thinking** thinking. Miss Earhart\* put several classes under special training to test this possibility and found, as a result of the experiment, that "pupils in the elementary schools in grades including the fourth, as well as higher classes, are able not only to employ the factors of logical study but also that by means of systematic effort they can be made to improve in their employment of them." These tests showed quite conclusively that children can gather data from outside sources and use the material intelligently. They can also "be trained to see the important points in a lesson and to group the related ideas about these centers."

Miss Earhart then proceeded to find out whether children are taught to think in school. She tested **A test which shows children are not taught to think** more than a thousand pupils in the sixth and seventh grades, and the questions which she used dealt with geography. These tests failed to "reveal any power the children in these classes may possess of seeing discrepancies between what they read and what they know." They did not show any power in the children to doubt on the basis of known facts. The children were usually unable to discover what the lesson was about; but her experiment proved that they are capable of thinking and that they will

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\* *Teaching Children to Study.*

so if daily they are held to the requirement. If enough pupils use the various factors of proper study to show that it is possible for children of their age to employ them, the questions arise," continues Miss Earhart, "why do not more of the pupils use them? Why are they not in common use?" To answer these questions she visited some seventy classes in various parts of the United States and sent a *questionnaire* to one hundred and sixty-five teachers to learn their ideas regarding study and to ascertain what they try to have their pupils do when they teach them to study. Another *questionnaire* was sent to principals of schools to be filled out after certain recitations had been observed. Careful examination of the results of the observations and of both *questionnaires* compelled the conclusion that, although pupils possess ability to employ the various factors of proper study, the teachers lack a clear conception of what such study is." They "tend to exact memorizing."

That children study words rather than thoughts was the conclusion of an investigation made by an investigation Miss Martha Baldwin.\* They had its conclusions study in a mechanical way which enables them to say that they have studied the lesson the required length of time. "They read the words over and over, and doubtless got more confused the more they read." The investigation shows loss of time, the acquisition of bad habits of study

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\* *Archives of Psychology*, No. 12, March, 1909.

by mind-wandering, memorizing of words without understanding the thought, and lack of concentration.

Reavis,\* in his study of pupils in the grades, found that children do not know how to acquire efficient habits of work. They do not know what habits are efficient.

Another investigation

Well intentioned children often go blundering along, adopting finally, perhaps, a lazy, loose habit of work, or they acquire no habit except that of mind-wandering, catching an idea now and then during the lucid intervals between the flight of pleasanter ideas. Pupils' habits of study, Reavis says, may be analyzed, the individual weaknesses discovered, and the teacher will then know when and how consciously to plan to strengthen or inhibit certain habits. But this, of course, implies that the teacher first learn how to study.

This problem of producing a body of pupil workers is, of course, fundamental to good teaching.

A gage of

good teaching

The reason for the emphasis on recognition of individual traits of children, in the early part of this chapter, was that such recognition tends to promote study. It matters not how well a subject may be presented, the result will be unimportant unless the pupils react, and the measure of their reaction is the strength of their desire to find out something more

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\* *Elementary School Teacher*, Vol. 12, p. 71; *School Review*, Vol. 19, p. 398.

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out the matter for themselves. If this desire is so irresistible that it drives them to reference books for further information, the recitation has been a success. Moreover, they should be able to distinguish between confused and clear knowledge, and they do not make this distinction when they are satisfied with merely "learning" the lesson. Unless their study starts questions that will not remain unanswered the success of the work with them may be doubted.

Grappling with a puzzling question may be made quite as exciting for a boy as an involved "play" is the use of a in football. Children are overflowing with curiosity for explanations and if the demand for answers to their current of queries ends at the entrance to the schoolroom the teacher may well examine himself and his method for the cause. And yet a superintendent, who has evidently given a good deal of attention to the conditions prevailing in the schools, says that "every term a great number of pupils are passed from the grammar schools into the high schools, and many of them are absolutely ignorant of what it means to grapple with an intellectual problem. Unless some high-school teacher is wise and sympathetic enough to help them find out how to study, they flounder around helplessly for a few months, or at most a year or two, finally to drop out, disgusted with school, books, teacher and

education, because they never really learned how to work.”\* As an illustration of how weak a hold questions and problems often have on children, this superintendent goes on to say that on one occasion he observed that a large proportion of the pupils in his school studied three or four lessons during one hour. “These pupils thought they had prepared their lessons for the entire day in one study period. The rest of their time that was not spent in recitation was wasted in looking around, talking, writing notes and in other kinds of idleness. . . . A few tests brought out the fact that many of our pupils did not know how to study. They worked well while tasks were easy, but when difficulties were encountered in the work on which they were engaged it was dropped at once and a new task was sought.” Surely no one will maintain that this pen sketch of a schoolroom exaggerates the conditions.

An attempt has recently been made to ascertain the extent to which high-school children understand and act on suggestions. The experiment was made on a first year mathematics class.† The suggestions were given one morning with unusual care. “The pupils were then told that the next fifteen minutes would be given to studying the lesson, and that they should begin

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\* *The Importance of a Study-Program for High School Pupils*, by W. C. Reavis. *School Review*, Vol. 19, p. 398.

† *Teaching High School Pupils How to Study*, by Ernest R. Breslich, *School Review*, Vol. 20, p. 505.

the assigned work immediately. The experiment showed at once that the pupils did not appreciate the value of limited time, for all were slow in beginning. It took some of them the whole fifteen minutes to go through the technique of getting started. Several evidently were not in the habit of working alone, for they looked about helplessly and simply imitated the others. However, these same pupils had come to the class room daily with their lessons well prepared. Very little was accomplished in the fifteen minutes, indicating that the pupils very probably wasted much time in studying their assignments of home work. Although the class had been in the high school only a short time, the teacher had been presupposing a habit of study which did not exist." The pupils who were helpless in their work and simply imitated the others, yet daily came with lessons apparently well prepared, probably received injudicious help at home.

The results of home work were investigated by the writer from whom we have been quoting. Two

**Results of an investigation of home work** classes, one a little weaker than the other but taking the same work, were selected for the experiment. The weaker class, without home work assignment, studied under supervision in the school and the stronger class was given home work according to the usual custom of the school. The subsequent tests showed that the weaker class under supervised study excelled the stronger class without

supervised study but with daily home work. Several of the lowest in the weaker division brought their standing up to a creditable grade. "Both classes accomplished the same work within the regulation time although the weaker section did no home work and the stronger spent (or was supposed to spend) an hour and fifteen minutes daily on the assigned lesson."

Under the usual system of instruction the teacher is likely to use most of the time in testing the pupils'

**Need of more knowledge and in imparting new**  
**pupil initiative knowledge.** The pupils follow his questions and explanations and, having good memories, they are able to give back in a more or less disjointed, if not distorted, form much of what they hear and learn; but all observations of the ways in which children study seem to indicate that there is little personal reaction. They do not learn by doing. Frank McMurry found that they have little, if any, initiative. "It was their custom (in the classes under observation) to wait for assistance and direction—even to sit down—and it was a custom so well established that five weeks of daily work with them in history and geography, with the avowed object of breaking it up, only barely began a reform. . . . Who will assert that such lack of initiative is natural?"\* Adaptation to the school habit of awaiting help had evidently become too firmly fixed to be cured by five weeks of treatment.

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\* *How to Study and Teaching How to Study.*

The absence of all incentives to even the simplest kind of originality is one of the common criticisms of the recent educational surveys. **Reports of school surveys on initiative** "The pupils are doing too little studying and thinking and too much getting of lessons and reciting," according to the report on the East Orange (New Jersey) schools; in the high schools of Vermont, the investigators of the Carnegie Foundation noticed that the responses were "slow and furtive"; answers had to be "pumped or suggested." There was no spontaneous reaction to the content of the lesson; and, again, in Ohio, the State School Survey Commission says that "insufficient attention is paid in all types of schools to developing the pupil's power of initiative, the capacity for team work, and of habits of study and cooperation." In summarizing, the report adds that "the most common fault of teaching observed in thirteen hundred eighty-five complete exercises were, teaching from the book exclusively, leading questions, and unnecessary telling" by the teacher, all of which, of course, prevents the growth of initiative because the method offers no stimulation to original effort.

The evidence from these various experiments and investigations indicates that pupils do not know how **Conclusions from these experiments** to study and that some of the time spent in "hearing lessons" might be better employed in helping them learn this art. The reform, however, should begin with the first



day of school when the teacher is new and, for that reason, an object of some anxiety. With the appearance of "the new teacher" the children are in a state of what may be called expectant equilibrium. They anticipate changes and are more or less prepared to adapt themselves to them. Their habits are in solution, as it were, ready to crystallize into new forms. This is the time when a vigorous personality molds new types of thought and action.

We have been considering efficiency in teaching from the point of view of the work the pupils do when at their studies. There is, however, another vantage-ground from which this same subject may be observed, and that is the kind and number of questions which teachers ask. Obviously, the sort of questions which experience leads children to expect will largely determine their method of study. It is another case of adaptation. As far as possible children fit their study to the questions they expect. If the running-fire method is used, answers of a single word or two will be given and thinking will yield to memory.

A valuable investigation of the art of questioning, as it is practised in the schools, has recently been made by Miss Romiett Stevens.\* The investigation covered a period of four years and included grades from the

**Another view of  
teacher efficiency  
—the art of  
questioning**

**An investigation  
of this art**

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\* *The Question as a Measure of Efficiency in Instruction*, by Romiett Stevens, Columbia University.

## LEARNING BY DOING

venth grammar through the last year of the high school. Twenty lessons were stenographically reported. These reports were afterward submitted to the teachers of the several classes for correction. In addition to this set of shorthand reports, in each of which everything said by the teacher and pupils is taken down, two different studies in observation were made. First, a series of one hundred random observations in various subjects of the curriculum was made for the purpose of counting and rating the number and nature of the questions asked; and second, a series of observations of ten selected classes, each class being followed through the entire school-day to study the "question-and-answer stimulus in the aggregate as it is administered to school children daily." On going to a school for the purpose of observing and obtaining stenographic reports the classes of the best teachers are always selected. This detailed statement is given to show that the conclusions are drawn from teaching far above the average of even our best city schools.

The most profitable questions are, of course, those that come as the result of reflection and which are put to obtain information needed in thinking out some problem. The resulting data naturally, the greater part of these must come from the pupils, and one of the tests of good teaching is the number of such questions. If they are not asked,

it is pretty good evidence that there is no thinking. Now Miss Stevens' stenographic reports show thirty questions of this sort out of a total of two thousand, and some of these thirty were asked by the teachers to ascertain whether note-books were ready. Further, Miss Stevens estimates that among these same two thousand questions there were at most only two or three hundred which might be said to stimulate reflection. But a large proportion of even these questions, she adds, were of the kind represented by "What do you think?" and others of a similar nature.

Almost total lack of natural questions—questions asked because of desire for information needed in thinking—was a common fault observed by the Ohio State School Survey Commission. The Portland (Oregon) School Survey Committee also found entire absence of originality. "Except in one exercise, in all my visits to grammar-grade rooms," says the investigator, "I heard not a single question asked by a pupil, not a single remark or comment made to indicate that the pupil had any really vital interest in the subject-matter of the exercise; on not a single occasion was there interested disagreement and active discussion over any point to show that the pupils were thinking independently."

Closely connected with the small number of thought-provoking questions which these investiga-

**The danger of rapid questioning** tions reveal is the rapidity with which Miss Stevens heard questions asked. From two to four a minute was the average during the forty minute periods. Obviously, children will not learn to think when questions are shot at them by this rapid-fire process. There is no inducement to think because the method appeals to verbal memory—even associative memory plays little part—and children are very quick to adapt their mode of study to the plan that brings the best immediate results. When under fire of questions the best protection is to have the bit of information on the end of the tongue ready to be dropped out, preferably in a single word, without the delay of a moment's reflection.

Even with history, especially suited for training in discriminative judgment, "in the hundreds of **Concerning the form of questions** class rooms where I have made observations of the questioning," says Miss Stevens, "I have found very few questions so framed by the teachers that they called for any individual judgments. . . . Analysis of the six stenographic reports on history reveals the fact that by classifying as a judgment question every one that could possibly involve the element of judgment the highest attainment is twenty-eight in a total of one hundred and twenty-five, and twenty-nine in a total of one hundred and five, while the lowest record was three in sixty." But Miss Stevens further observes, in this connection, "that the

judgments were largely upon choice of words with reference to historical interpretation. Removing many of the quoted questions from their history setting, one might as easily believe that they were taken from an English lesson." The Ohio State Survey Commission also found that in the teaching of history "there was little sign of real activity on the part of the pupils, questions of any kind by pupils being extremely rare."

The amount of time monopolized by teachers was another striking defect in teaching revealed by Miss Stevens' investigation. The average percentage of teacher activity in twenty stenographic reports, as measured by the number of words spoken, was sixty-four against thirty-six collective pupil activity. Concerning the monopoly of time by teachers A city superintendent, stirred by the report, inspected his own schools to see whether it could be possible that his teachers were doing so much of the class work and he estimated the teacher activity in his schools at from eighty-five to ninety-five per cent. when the teachers were not lecturing. Even in classes in which the number of questions was reduced from four to two or less per minute, the collective pupil activity was only about thirty-seven per cent. The children's part in the recitation consisted chiefly in occasionally punctuating the teacher's answers and remarks with a word or two. Evidently teachers "carry the ball" too much as a boy once said. Thinking does not

differ greatly from football in the manner of acquiring the art. There is but one way of learning either, and that is by "playing the game" and "playing hard." In neither case is skill acquired by sitting in the bleachers and watching others. Whatever the occupation the only way to gain proficiency is by actually doing it. Children rarely work harder than the conditions require and if teachers prefer to do the work for them the pupils will not deprive them of the pleasure.

The problem of efficient teaching is how to force children to think. Work will then take care of itself. The desire for answers to questions that seem to contradict knowledge and experience and which will not down until the apparent contradiction has been removed, is what is wanted in the school. When this attitude is produced and responsibility put upon the pupils they develop the power to start things and carry them through. Following a leader, even though that leader be the teacher, tends to take from children whatever latent ability for initiative they may have. This effect has often been observed on adults. A man kept for a number of years in a subordinate position with all his work laid out loses the power to think and act independently. Though pupils adapt themselves to predigested mental nutriment yet, in their more serious moments, they rebel. "We don't need to think," said a boy of fourteen, recently, to the writer. "We just follow the book."

**Kernel of efficient  
teaching—train  
children to think**

Miss Stevens found this criticism true. "It is the book first and always," she says. Knowledge and experience are not necessarily used just because one has them. Their use must be learned like the handling of any other tool; and skill can be gained only by those who do the things themselves.

When responsibility is put upon the pupils, when their own thoughts and investigations at home and in the library rank above the text-book and even above the teacher's statements, they will adapt themselves to thinking, which after all is a pleasant pastime, and so many questions will arise that the hour will be too short. Then teaching will be efficient, for children will be taught to do their own work "as if you taught them not."

## CHAPTER III

### GETTING RESULTS

YOU have, I am sure, read the story of *Alice in Wonderland*, and you will recall that when Alice had lost her way in the maze of wonderful sights she met the Cheshire cat.

“‘Would you tell me, please, which way I ought to go from here?’ said Alice.

“‘That depends a good deal on where you want to get to,’ said the Cat.

“‘I don’t much care where—’ said Alice.

“‘Then it doesn’t matter which way you go,’ said the Cat.

“‘—so long as I get somewhere,’ Alice added as an explanation.

“‘Oh, you’re sure to do that,’ said the Cat, ‘if you only walk long enough.’”

The Cheshire cat understood the philosophy of good teaching as well as of walking. Fear is often expressed for the welfare of children under teachers who are trying to “get somewhere” by progress through experimental and error method, by experiments, but the ones who really need our sympathy are those in schools where the same method



is followed day after day. The teacher who tries new ways may make mistakes, but trial and error are the method of progress. They are also the method of good teaching.

A few days ago the writer attended a teachers' meeting in which new plans of work were being discussed.

"I have gone through the whole series of fads," one teacher said. "I tried them all as fast as they came out, and they all failed. We had better hold to what has stood the test of time." Suppose Ehrlich had said that after trying six hundred and five experiments. He would have missed by a single experiment one of the greatest medical discoveries of the age. After all, success is relative. Were Ehrlich's six hundred and five experiments failures? If they were he would never have attained his goal. For it were folly to think that his discovery was an accident. He learned something from each experiment, gradually eliminating one error after another, always mindful of his purpose. And right here we see the reason for the failure of the experiments that the teacher tried. He went through the list as many travelers to Europe "study" art. They visit the galleries, view the paintings starred in Baedeker and pass on. The dividends of experience are always in proportion to what we ourselves invest in the enterprise. Experiments are planned experience and their success requires confidence in the

method and enthusiasm for results. One rarely succeeds in doing what one believes will fail. In such cases the mental attitude is in opposition to success.

Experience that counts is not gained by merely living. Rousseau was right when he said that a man may be buried at the age of a hundred years, who really had been dead from the hour of his birth. Experience involves interpretation of conditions and situations. Data gathered for the purpose of discovering new meaning becomes, for the thoughtful, data *with* meaning. But events may come and go and leave no impress. This was the case with a teacher of fifteen years' "experience" who recently said to a beginner, "You will not be so enthusiastic about your work when you have taught longer."

The life of an infant is a "big, blooming, buzzing confusion," William James once remarked. That is what life always is, and education, in the highest sense, is only an attempt to bring a little order into this confusion and to clarify it as far as available knowledge permits. This involves interpretation, and interpretation requires the accumulation of data for comparison in order that the essential may be separated from the accidental. Only through the elimination of the unessential factors can we discover cause and effect, and if we do not do this we are only living through the events which would give us experience if rightly

interpreted. We are not getting experience. Interpretation necessitates thinking, which has never been popular because of its difficulty. "I am inclined to hold that man really thinks very little and very seldom," said Wundt, not long ago, when comparing man with the lower animals, and Josh Billings expressed the same conviction in his quaint way when he said, "Tain't what men don't know that makes trouble in the world, it's what they know for certain that ain't so."

Teaching is much the same as other occupations. We shall find in a later chapter that business men who are satisfied with the old ways of doing things inevitably give way to the more progressive. In science no one lasts long who does not seek to add to knowledge by investigation and experiments. Contentment is death. "It is a signe his wits grow short, when he is pleased; or a signe of wearinesse," said that keen critic of human nature, Montaigne.

I know that teachers are overworked. They are burdened with classes and teachers' meetings and reports which are of no use except to fill the superintendent's annual report with figures that are never read. A real experiment, however, gives zest to class work and the teacher who is enthusiastic over the results is amazed to find his "wearinesse" gone. Fatigue is quite as often the effect of monotony as of excessive work. In an experiment the children catch

the enthusiasm of the teacher. Besides, a well planned experiment grows out of the needs of the pupils. Each child then becomes a problem for study instead of a disturbance to be suppressed; and the solution of every child-problem contributes to the interpretation of the experiment. New plans of conducting classes—plans arranged to circumvent school indolence—keep the teacher and pupils active because of the unexpected situations which continually arise under the experimental method. Constant effort to fit the plan to the instinct of children to work out their present salvation—their tendency to construct, to direct, to manage, and in their management to reconstruct and improve—keeps the teacher alert and the appeal to their native impulses stirs the enthusiasm of the pupils. “The attitude of the teacher as she teaches, of the pupil as he learns,” says the Portland report, “is unquestionably of far more importance than is the subject with which they deal; when passive, neither teachers nor pupils are putting themselves into their work.”

The experiments which follow are not theoretical. They are real. They have been actually tried in schools. In most instances the writer has corresponded with the teacher in charge to learn something more than mere details. They are offered as examples of how some teachers have tried to vitalize their work. Every one can not use them. The

**Learning to know  
one's self through  
experiments**

first requirement for success in repeating an experiment is like conditions, and adults are not alike. Personality must always enter into the reckoning in computing the reaction of children. I mean the personality of teachers. For the response of groups of children under the same conditions may be foretold. The unknown quantities, whose values are to be determined, are adults. And, in this human equation these values must be computed in terms of the known quantities — children. Such experiments, therefore, perform the further service of helping teachers to know themselves, since one success is all that is needed to justify an experiment. Inability to repeat what others have done successfully gives occasion to study one's own personality in the light of the facts which the experiment and failure disclose. As an illustration of this method of checking up one's idiosyncrasies, the following may be quoted from a letter of a teacher who had tried the same experiment with two classes of about one hundred each:

“What puzzled me was that the two classes reacted in quite different ways. I am inclined to think, however, that the cause lay  
**Illustration** in myself; because I think that in the second year I unintentionally assumed more authority than when trying the plan for the first time. Perhaps, too, the fact that I was quite evidently feeling my way the first year caused the children to take more responsibility on themselves so as to help

## LEARNING BY DOING

work along. I shall certainly try it another year."

Let us now pass to the first of our series of experiments. The following is a plan tried in teaching first year composition in the high school.\* The early part of

work was given to practice in sentence structure, variety of expression, punctuation, capitalization, paragraphing, etc. The material was always taken from the every-day life of the children. In this way straightforward narrative without plot was taught. The experiment itself began with the second term. At the beginning of this subject," the teacher continues, "we usually take some narrative of a simple incident, a buggy-ride, for instance. I ask the pupils to introduce 'something' that will interfere with the ride. Immediately various obstacles are suggested—a piece of paper or an automobile, at which the horse is frightened—and before we know it a simple plot is formed of the resulting runaway."

The teacher then announced to the class that they might write a book on "The Adventures of Johnny," "Johnny to be a mischievous small boy and the adventures to be taken from various stages of his career. Each composition—one a week—that we wrote in this manner was to constitute a chapter of the story. . . . There were a few dubious, some superior and many

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\* *An Experiment in Teaching First-Year Composition*, by Gregory Gordon, *School Review*, Vol. 14, p. 671.

apathetic members, but before we reached the end of the 'Johnny' series, out of a class of over a hundred there were not more than four or five who were unresponsive. Their delight in creating something—in the thought that they were 'authors'—removed the idea of drudgery which the word composition is wont to suggest, and gave them an acute interest in the proceedings.

"In the first of the series, 'Johnny's First Battle,' I gave the circumstances of the story, introducing Johnny as a boy of four years who had been given a soldier's suit and equipment with which he goes forth to conquer. The 'something' that occasions the plot presents itself in the shape of a turkey gobbler. A battle ensues. Its issue, and the consequent story, the pupils were to recount according to their own ideas." The following is one of the chapters which was written by a pupil:

#### JOHNNY'S FIRST BATTLE

There was never a happier little boy than Johnny, on his fourth birthday, for Uncle Harry sent him a soldier suit and his papa gave him a gun which would really shoot a rubber ball. The tenth of May, Johnny's birthday, was rainy and cool, so Johnny was made to stay in the house. Before the day was over he had broken two panes of glass and hurt every one in the house from grandma down to Baby Ruth, with "the horrid gun," as grandma called it.

That evening, Johnny's big brother was reading a book which had on the cover a picture of a soldier. Johnny asked what the man was doing, and when he was told that the man had started out to conquer the world, it set his little mind to thinking. When his mamma tucked him into bed, he said, "Mamma, how big is the world?" On being told it was many, many miles around he gave a little sigh—but soon fell asleep.

When Johnny awoke, he asked his mamma to dress him in his soldier's suit. After having his breakfast, he started out to conquer the world. He succeeded in subduing the world as far as the barnyard gate, when he met an old turkey gobbler who refused to be subdued. Discovering that he had left the rubber ball at home, Johnny hit the turkey with his gun. At this the turkey commenced pecking and flapping his wings in Johnny's face. Johnny fought bravely, but a great turkey gobbler was too much for a four-year-old boy. Mamma heard the screams, ran to the door, and seeing what was happening ran to Johnny's assistance with a broom. Johnny was brought into the house, a very much bruised, but very happy, little boy, for he thought he had conquered at least half the world and could do the rest to-morrow.

After titles and suggestions for the plots of chapters, "Johnny Runs Away" and "Johnny's First Day at School," had been given, the children asked permission to choose their own subjects and to be allowed to work them up as each desired without suggestions from the teacher. The following is one of these chapters:



## JOHNNY'S PIGEON-BOXES

At the age of ten Johnny had a great deal of work to do, at least he thought so, and often **Another "chapter"** grew very angry because his plans were destroyed by his being called into the house to do some work. One day Johnny was sent out to watch his small brother while his mother ran to one of the neighbors. The carpenters had been reshingling the summer kitchen and had left their ladder leaning against the house. Johnny saw a fine opportunity to put in operation a long-cherished plan. After fastening the baby into the chair, he went to the wood-shed after some pigeon-boxes that he had built long before. He mounted the ladder for the purpose of putting these boxes on the roof and as he was drawing his knife from his pocket, it slipped from his fingers and landed with a loud whack on the head of the baby, who at once set up a howl that brought his mother in double-quick order. Johnny crawled down the ladder a very frightened boy. His fear increased as his mother appeared with a large switch and he was led into the house. What happened in the house is known only to Johnny, his mother and the switch.

These little chapters are a decided relief from the spiritless compositions usually offered. The teacher made this discovery when she read her hundred themes each week. She opened every paper with the interest that attaches to a story, and the amazing and beguiling complications that were woven into plots gave a continuous succession of

**Effect of experi-  
ment on teacher  
and children**

pleasant surprises. The effect upon the children was no less striking. While some papers were very faulty and many needed revision and rewriting, an exceptionally large number of the class, according to the teacher, learned to write in a free, easy and natural manner. The reason for their success is that the children felt that the work was theirs. They were authors. Young adolescents are always interested in doing things when responsibility accompanies the work. The source of this enthusiasm is the desire to control, to manage, to create, and when the work is done, to feel that it is their production. This is the spirit of youth.

Another experiment was called to the writer's attention a few months ago by the **An incident about a physics class** following item, which appeared in one of the New York papers:\*

Every boy of the twenty-five hundred who attended the public school at Broome and Willett Streets was fired with admiration and interest when two diminutive Edisons from their ranks set up a telegraphic system, operated by wet batteries of their own construction and stretching four hundred feet through the school building from one room to another. For weeks the two boys had been reading the life of Morse and studying the scientific principle behind this use of electricity.

Yesterday they were ready for a demonstration, and the principal stood beside the transmitter and

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\* *New York Times*, April 2, 1913. Unessential statements have been omitted for brevity. The report names two boys but the principal mentions only one.

dictated the first message sent to the receiving operator in the distant room.

Since a recent report\* of the United States Commissioner of Education has shown that physics and other high-school sciences have been rapidly losing pupils, the writer thought the evidence of enthusiasm indicated by this newspaper item worth a letter of inquiry. The following explanation of the cause of the interest has been taken from letters received from the principal of the school and the teacher of physics.

“The problem of arousing and maintaining interest in the study of elementary science is largely  
**Cause of their** solved when boys can be induced  
**enthusiasm** to make something of their own. The home work is often crudely executed, but it delights the boys because it works. They become very enthusiastic when they fashion something useful. The study of pitch, for example, is not essentially interesting of itself, but it acquires an interest when boys can play melodies on violins of their own making.” A number of boys in this school constructed violins out of cigar boxes upon which simple tunes could be played. Indeed, a “Cigar Box Orchestra” was organized. Equilibrium toys, pith ball electroscopes, various kinds of batteries, a model of a steam-engine, induction coils and parts of wireless outfits were also made. Four boys in-

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\* Report of the United States Commissioner of Education, 1910, Vol. II, p. 1139.

## LEARNING BY DOING

lled home-made wireless apparatus in their homes. In a word, boys make things for the fun of making them."

The writer has elsewhere\* described the "town-meeting method" of teaching history. The class was organized into a New England town-meeting, with chairman and secretary, and the recitations were conducted and the lessons assigned by the chairman. The following experiment, which is suggested by the success of this town-meeting plan, has been carried on in the English classes of the Somerville (Massachusetts) high school. The writer is indebted to the teacher, Miss Elizabeth Hunt, for the interesting description:

"First of all," she says, "I let my classes decide whether they wish to be governed by a chairman. If they do not, I continue to act as their head." The correspondence shows that they usually decide to elect their own chairman. They also have a sort of Supreme Court, legislative body, selected by ballot from their members. This court decides questions which concern the success of the class work and has the power to initiate "legislation." Miss Hunt then concludes: "I am always the referee to decide all cases which the judiciary can not settle. In other words, I am the Court of Appeals. When the pupils find a lazy boy or girl they bring him up standing by

\* *Youth and the Race*, pp. 238-240.

means of a law which they pass in their executive board meetings or sometimes in the class, but usually in the former to save time. The board meets at the close of the recitation. I attend when they request my presence, but they usually meet by themselves and report their decisions to the class at the next meeting. We have the 'recall' in operation. If they do not like the decision of the board, they do not accept it, but a two-thirds vote is needed to overrule. Then a pupil has the right to appeal to me from any decision, and if I think the decision unjust I do not sustain it, but give another penalty. I rarely fail, however, to sustain the decision of the lower court, for I find, as a rule, that those whom the class elect to act as the judiciary branch of their organization are wise enough to meet conditions which arise. They usually lean a bit toward severity and sometimes I feel it necessary to ask for clemency.

"As an instance of how the class manages a situation, a few weeks ago my class of boys was studying *Quentin Durward*. We often carried out have parts of a chapter read in dialogue form, leaving out the explanatory matter. Suddenly the lesson began to drop into just the readings, no one saying anything on any subject which he had looked up outside to throw light on the lesson. The chairman of the judiciary board arose and said very energetically: 'I think that we are just giving our members a chance to bluff

through the lessons. Many give no proof that they have done any preparatory work ahead. Any fellow can get up here and do what we are doing without any preparation and we don't get any variety out of it. The judiciary committee suggests that in the future only two scenes be allowed at a meeting and those by fellows who have offered other work.' This was at once put to a vote and carried, a good-natured grin being noticeable on the faces of some of the boys. I had been waiting to see how they would meet this without my saying anything. Had this been a class where all depends on the teacher for support no one would have said a word. The chairman of that week had gone to the judiciary board and asked it to act. He felt the responsibility. I had said nothing.

"The other day the same class took up another matter that I knew must be handled. The debates **Absentees dealt with by the class** come once a week, four boys at a time. Twice lately members of the team had been absent on that day, thus throwing out the others. As the class was expected to study the question there was no other lesson ready. The second time this happened the boys were indignant and the class passed a law that unless those having parts could prove to the satisfaction of the judiciary board that the absence was unavoidable, 'and that means that you can't get up,' those failing should prepare two debates, and in any case where it is possible they should let the others know in time

to notify the class to prepare a lesson from the book. 'We can't afford, fellows,' said the mover of the motion, 'to waste lessons like this.' No one laughs at the others for such zeal. It is their work and they know that we have just so much to do each day to cover the work in eight weeks.

"The chairman plans the work for the following day, then calls for volunteers, those who have prepared related topics outside the lesson. After this he asks questions, selects passages to be read or takes up words needing explanation. At the close of the hour I may comment on topics, correct the mistakes in pronunciation which they have overlooked and, in fact, act as guide or helper. But it often happens that there is no need for me to speak a word during the entire recitation.

"If there is disorder they handle it themselves, either at once or by calling the offending member before the judiciary board. I always tell them that, like any governor, I must step in and declare martial law if they can't keep order, for I am the responsible head of the school. Once I stepped in too soon, and, at the close of school, the chairman said very politely, 'Miss Hunt, I think I ought to have had a little more time to meet that. I could have done it.' I apologized to him and admitted that I had made a mistake. It is hard to down the old pedagogical training, but I have found that it pays. It requires

tact, infinite self-control and wisdom to hold in abeyance the instinct of a teacher to jump in and rob the children of the experience of untangling their own snares, but if the teacher can only learn to let them work out their problems, even if they get into very complicated ones, it is a great gain for these young citizens and they always profit from it.

"When they waste time in unprofitable discussion some one will suddenly say, 'Let's get down to work.' If the work which must be done each day is not finished they know that it means an extra hour somewhere, so they take their medicine without a murmur and come together at the close of school. I do not compel them to come. They know that it is necessary and the chairman calls them together. Had I been to blame, they would have grumbled. But they feel the responsibility and act accordingly. I purposely let them learn the price of time.

"As to the work accomplished, I know that we never did so much outside reading in the old way.

**Results of plan** For example, one of my best classes, a college division, wished to dramatize *A Tale of Two Cities*. I left the planning of the entire work to them. We went into a committee of the whole, broke up into groups and I passed from one group to another as they beckoned to me. We finally evolved the plan of appointing four leaders who should choose those who were to divide the story into acts, those who were to write



the scenes, select the actors, stage managers, etc. We had eight weeks in which to do it and they kept their forces at work 'day and night.' When they found a lazy boy who refused to take the work assigned, or who did not keep at it, they dealt summarily with him, and before it was necessary for me to take a hand he was at work. Had I given them such an ambitious task the groans would have been deep and loud. I was, in part, responsible for the suggestion, because I wanted them to have that practice, but I should never have required it of them. They did it wonderfully well. Each day a scene was ready. The writers read their parts and the class, viewing it as a play, detected faults, gave advice, told where it was not clear, where it dragged, where it must be given more situation, etc. All of the principles upon which we had drilled in the study of the drama during the early part of the year were hunted up and brought forward with a great display of wisdom. A year of study in the usual way would not have accomplished what they did in that short time.

"They also gained a much better appreciation of the whole work than has ever been the case in any of my classes conducted on the traditional plan. One boy said to me: 'Miss Hunt, I never knew before the difference between the work of a novelist and that of a dramatist. I did not understand the drama when we studied it the first part of the year, but now I

do.' This is only one of many instances which might be cited.

"The other day in a debate one of the boys criticized a speaker for having his hands in his pockets while speaking. 'There are no girls present,' said another. 'The fellows at college are easy, why can't we be?' One of the others reminded the speaker that Miss Hunt was present and might object. I at once said that I wished them to act in the matter independently of the question of sex. I then suggested that they take it to the higher standard of what the best speakers do in public. They observed for a week and then unanimously decided to keep their hands out of their pockets while speaking.

"The following is another instance of the way in which a social attitude develops through their feeling of responsibility. One of the boys was below in English. He was very popular and was one of the candidates for the chairman of the following week. We had made no rule about grades. The boy, however, rose and said, seriously: 'I am down in English and until I get square I don't want to be your leader.' This established a good precedent and brought forward another question which I was hoping would come up. Why should not the honor of being elected chairman be a spur to better work? They discussed the question and decided that the chairman should so conduct the lesson as to show

that he was studying and thus get his credits. This point having been settled they then decided to leave it to a member's choice whether he would accept the honor, if down."

Another experiment—this time in American history and government—which has come to the writ-

**Another experi-      er's attention, differs somewhat  
ment in pupil-      from the one just described be-  
government      cause it was not intended to give**

the children any unusual authority and control. After the work had started, however, the teacher, on account of alarming symptoms, was suddenly forbidden to use her eyes. Since a substitute in the middle of the year was undesirable, she was given permission to follow any plan that seemed wise. Her helplessness necessitated giving the children much more authority than had originally been planned, and the children responded with the frankness that they always show when responsibility is put upon them. It makes an interesting comment on the efficiency of pupil-government that in the following year, when the teacher recovered her health and again assumed the authority which, during the previous year, she had been obliged to delegate to her pupils, the plan failed. With loss of responsibility in managing their work the interest of the children dropped to the level of that in the ordinary recitation.\*

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\* The writer is indebted to Miss Nellie Hammond, of Woburn, Massachusetts, for the following description of the experiment.

Having spoken of the trouble with her eyes which threatened to force her temporary withdrawal from the school, Miss Hammond says: "After thinking the matter over carefully, I decided to take the children into my confidence. I explained the situation to them and told them that they must decide whether I should put in a substitute. All the classes voted that if I would stay they would carry on the work as well as they could for themselves.

"The recently elected school committee of Woburnia, our school city, took charge of the senior class." This school committee of eight pupils had been elected some weeks before by the senior class from its members for the purpose of assisting the teacher in promoting the interests of the class. The divisions were large and one of the problems was to have each pupil take part in the discussion often enough to assure daily preparation. This committee had already responded with zeal to requests for assistance. It had made many suggestions and had relieved the teacher of much of the routine work. Now, of course, Miss Hammond being unable to use her eyes, the responsibility increased. "I gave the committee outlines, reading lists and plans of work used in previous years from which they assigned lessons, topics and readings. On the whole I think the work went on much as if I had planned it. They showed considerable originality in the study of local government. The seriousness with which they dis-

cussed existing evils and the weight of responsibility which they seemed to feel was surprising. I think that each boy felt that the salvation of Woburn rested upon his shoulders."

The mayor of Woburnia, the school city, prepared an inaugural address which he delivered before the school. His address, which the writer has before him, is a very creditable discussion of the financial condition of Woburn, the assessment of property, insurance, the fire department, water department and schools.

"The junior class," Miss Hammond continues, "had no organization with which to begin their work of self-instruction, so they drafted a constitution." As this class was studying modern and current history, the constitution, after stating the object, which was to increase the interest and efficiency in the work, made provision for various committees. Among others there were the Topic Committee, to prepare outlines, the Library Committee, to find references for outside reading, the Far East Committee, the Near East Committee, the Committee on European Affairs, the Committee on United States Affairs, the Committee on State Affairs and the Committee on Woburn Affairs. These committees were to report on historical and current topics within their jurisdiction.

"There was no hesitation on the part of any one in undertaking his share of the work. I was im-

**Plan of organization of junior class**

**Spirit of  
their work**

pressed with the business spirit manifested. There seemed to be no supersensitiveness or affectation. The work had to be done and they were to do it, so each did his share to the best of his or her ability.

“One incident showed the moral feeling that develops under pupil-government. The pupils had **Moral effect of pupil-government** voted to take a secret ballot at the recitation following an examination. A ballot marked ‘yes’ indicated that the one who cast it neither knew nor suspected any one of cheating while a ballot marked ‘no’ meant that the voter did know or suspect some irregularity that should be cleared up. At the first ballot there were twenty ‘yeses’ and ten ‘noes.’ A discussion of the duty of the ten voters followed. There was a strong disinclination to tell on any one, but at the same time they felt that the public welfare should be protected. Finally, it was decided that each one of the ten should come to me privately and explain the reason for his or her vote, and I was instructed to use my discretion about accepting or rejecting the examination. I took no part in the discussion, telling them that they should work out a line of action for themselves. At the close of school, a boy came and confessed that he had cheated. He said that he wanted to make sure of getting on the football team. When I asked him why he confessed he

said that the others would not tell on him and he did not want them to lose the test."

For a class in Grecian history, the Athenian Assembly is perhaps the most natural form of organization and it was in the Barringer High School at Newark (New Jersey) that the following experiment was tried.\*

The duties of the officers were modeled, as nearly as possible, after the functions of the corresponding officials in the ancient Athenian Assembly. The *epistates* (chairman) was elected and in each case the best student was chosen by his fellows for this office. But "the offices of *keryx* (herald) and *toxotes* (sergeant-at-arms) were bestowed, in at least two instances, upon students who were better known for their pleasing address than for their intellectuality."

A committee of the *boulé* (council) acting with the teacher submitted a set of resolutions to the *agora* (assembly, i. e., the class) each day. These resolutions were so worded as to include, in their discussion, the most important facts of the day's lesson.

The order of business of the *agora* (class) was as follows:

- I. A solemn curse on traitors, pronounced by the *keryx* (herald);

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\* *An Athenian Assembly; An Experiment in History Teaching*, by D. C. Knowlton. *School Review*, Vol. 18, p. 481.

2. Declaration by the *epistates* that the gods were propitious;
3. Reading of the day's resolutions by the *keryx*;
4. Inquiry by the *epistates* as to whether the *agora* wished to discuss the resolutions or to put them immediately to a vote;
5. Discussion of the resolutions (this constituted the recitation proper);
6. Voting on the resolutions;
7. Adjournment.

From the point of view of the purpose of the school the resolutions were, of course, the most important part of the program. **The value of resolutions** They dealt with the subject-matter of the day's lesson. Resolutions skilfully worded may be made to include statements and inquiries involving cause and effect to an extent that rarely enters into the study of high-school pupils. This is a distinct intellectual gain, since children in the school are prone to confine themselves to learning facts. How far such resolutions actually do promote thought will depend upon the committee in charge and the tactful suggestions of the teacher.

The most ambitious experiment in class organization of which the writer has learned is "The Roman State" of the classical department of the East High School in Rochester, New York. **An experiment in teaching Latin** The organization as described below is altogether too complex to be undertaken at once in high-school classes. The "State" to which we are referring was of three years',



growth; "consequently, since it was not all put into operation at once it did not require so much work and explanation as would appear. Each year the pupils were given the additional instruction needed for understanding what was to be developed during the year."\*

The Roman State of the school was organized with the creation of *collegia opificum* (trade guilds) each with its *princeps* (president), *magistri* (master-workmen) and *discentes* (apprentices). The pupils now learn much to their amazement—in view of the fact that, next to forms and declensions, war and speeches are the chief subjects of study during the first two years—that laboring men organized into trades unions were an important part of the Roman population. "And when they learn that the *fabri* (guild of carpenters) and the *cornicines* (musicians' guild) and others outdate the Roman Republic and even history, they gain a new idea of the antiquity of these institutions and their accompanying problems," as well as of the Roman Republic itself.

After the formation of the *collegia* each pupil receives a Latin name and is enrolled in the *curia*, *tribus*, *classis* and *centuria* on the basis, respectively, of birth, geography, wealth and age. "Birth is represented by scholarship and on that basis each pupil is made a patrician or plebeian."

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\* *A Modern Roman State*, by Mason D. Gray. *School Review*, Vol. 14, pp. 296, 357.

Naturally, the campaigns, elections and the activities of the "State" and its officials aroused great interest in the school. As it was desirable to build the "State" on the interests of the pupils, the *ambitio* (quiet canvassing) and the *professio* (public declaration of candidacy) came early in the organization. The youngsters learned that the candidates never took the initiative, at least in theory. They never announced their own candidacy, never spoke in their own behalf. This was done by their neighbors, friends and relatives. These facts the pupils find have been learned from inscriptions—the Roman newspaper. In imitation of the inscriptions found on the walls of houses and shops in Pompeii, the pupils painted some excellent inscriptions and the "variety of Latin employed would rival some of our prose books. A favorite mode of advertising (candidates) was to parody well-known passages of Cæsar, Cicero and Vergil." The following is a portion of a *Popularis* adaptation.

Schola est omnis divisa in partes tres; quarum una Populares, alia Equestres, tertia Optimates appellatur. Hæ omnes sensu, animo, opinione inter se differunt. Harum omnium honestissimi sunt Populares, propterea quod a facinore et stultitia Equestrium et Optimatum longissime absunt. Populares credunt et pueros et puellas in gubernaculo æquam partem habere debere. Itaque omnes boni cives, et pueri et puellæ, ferte suffragia ad

Populares et create Lowenthalum et Coddingtonam consules.

"The value of these inscriptions (written by the pupils) can not be overestimated. To express natural thought arising from one's personal experience, to further a real purpose, by the composition of a Latin sentence, is to most of our high-school pupils a rare experience and, when once felt, gives them a new feeling for the language. The question of Latin prose is always with us."

Meanwhile the parties had been preparing their platforms and the following are those of the *Populares* and *Equestres* parties. They were composed by fourth year pupils, the teacher says, and stand as they were written. They are interesting specimens of what high-school children can do with Latin and they show how intimate a part of the school life it may be made.

Nos Equestres haec, Quirites vobis pollicemur!

Primum—Summam in consulibus fore diligentiam, summam in senatu auctoritatem, summam in equitibus Romanis virtutem, summam in omnibus bonis consensionem.

Deinde—Consules nec tempus ad festos dies celebrandos, nec tempus ad luxuriam nec pilam et alias voluptates, nec denique ad quietem animi et corporis sument sed videbunt ne quid civitas detrimenti capiat, et omnes cives diligenter ad summam rem publicam se incumbant.

Maxime—Consulibus Boydo et McMatho creandis omnia vetera mala rei publicae oppressa et vindicata esse et secundas res et pacem appropinquare, templum Jani intercludi et aedificia pulcherrima in Forum ventura et doctrinam et litteras vigentes videbitis.

Denique—Atque omnia haec sic administrata erunt ut Jovis Optimi Maximi nutu gesta esse visura sint et consules sicut aliquos non ex hac urbe dilectos sed de caelo delapsos; et vos Quirites semper vivere velitis.

### PARS POPULARIS

Haec est pars una in re publica quae est populi et populo; pars sola quae aequam justitiam omnibus det. Aequitati et justitiae omnibus temporibus stetit. Huius partis fuerunt multi clarissimi viri, quo numero maximi fuerunt Gracchi et Drusus et Marius. Hanc partem Caius Julius Caesar ad victoriam duxit.

Si candidati popularum creabuntur, tota res publica pace et serenitate fruetur, et omnes cives beati erunt.

Nostri consules et censores nulla mala patientur, et potestatem Romae extendent.

Si summum bonum Romae vultis, suffragia ad hanc partem fertote.

“Even if the most important period in the life of the ‘State,’ which will always center about the campaigns and elections, did for a month cause a marked loss in the amount covered in the text-book,” continues the teacher, “I should maintain that the exchange were a profitable one, and that, furthermore, the

**Effect on  
regular work**

amount of text read, if that be made a criterion of progress, would ultimately be greatly increased by the greater interest, and, consequently, more rapid advance. As a matter of fact, the work of my own classes was not interrupted at all, while the other Latin instructors estimated the cost at from one to three chapters of Cæsar, one or two chapters of Cicero and two lessons in the beginning class." As an offset to this the pupils had the deeper knowledge of the life and times of the Roman people which they gleaned from the activity of the "State."

"Two or three individual pupils were found who permitted their interest to interfere with their other work, but . . . it was, to me, **A significant fact** very refreshing that, amid the multitudinous and wholly extraneous interests by which pupils are to-day distracted, one could arise with equal spontaneity, awakening and absorbing their interest to the same degree, while at the same time forming an integral part of their classical studies.

"It was incidentally a proof of the interest taken by the pupils, that in the very midst of the football season, in a school famous for its **A proof of interest** football enthusiasm, with a team not yet beaten, the display of party colors for the three weeks preceding the election quite eclipsed those of the school. One afternoon all the parties held mass-meetings simultaneously, and over half

of the pupils were in attendance at one or another. That anything in their study of Latin should so arouse their interest that such a proportion should voluntarily remain after school hours to further its success" is a striking fact in school life.

The article from which these quotations were made was written in 1906. A short time ago I wrote to Mr. Gray to inquire whether the "Roman State" had survived the eight-year interval. In a certain way, its power to survive would measure its educational value. What follows is taken from his letter:

Facts about this  
experiment eight  
years later

wrote to Mr. Gray to inquire whether the "Roman State" had survived the eight-year interval.

"To give you an idea of the activities of the 'Roman State' at the present time, I will mention a few of the things that are now in progress.

"1. The regular monthly issue of the *Vox Populi*, the organ of the 'State.' The contents are wholly the work of the pupils. No instructor corrects or supervises it.\*

"2. The presentation of a little Latin play called *Troia Capta*. About five hundred pupils attended. So interested were they in trying to follow the Latin that they asked that it be repeated immediately, which was done. The actors were chosen from a number of volunteer sight-reading clubs, conducted under the auspices of the 'State,' to which only

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\* The copy which was sent to the writer is dated the Ides of March and is number five of volumen IV. It contains six pages of Latin prose and poetry written by the pupils.

those of superior scholarship are eligible. Two other clubs are preparing similar plays.

"3. Initiation of freshmen. This ceremony was conducted a few months ago. The *pontifex maximus* and one of the *censores* went to the classes, accepted each pupil as a member of the 'State,' gave him his Latin name and tied his *bullæ* around his neck. Everything is said in Latin, at first with translation and then without.

"4. The monthly meeting of the *consilium*. This is a governing body in the 'State' and consists of the *Consules*, *Censores*, *Pontifex Maximus*, *Praetor urbanus*, *Tribunus plebis*, the three party campaign managers and others chosen by the consuls. At the last meeting, besides the routine business incident to the regular activities, a plan to start a Latin museum was presented by the chairman of a committee to which that duty had been assigned at a previous meeting. The *Praetor urbanus* was directed to present for discussion at the next meeting a revision of the laws and statutes and to prepare them for presentation to the *Comitia tributa*, a general Latin assembly. All of the formalities of the meeting are conducted in Latin, but no attempt has been made to use the language in the general discussion. I have, however, thought of making the experiment.

"5. The patrician pins. In two or three weeks all of the pupils and instructors will vote for the

pupils who, in each class, are deserving of the patrician pin, the emblem of scholarship in Latin. If the pin is held continuously it is given permanently at graduation.

"As to the effect of the 'Roman State' on the interest of the pupils there is no question. That this interest secures a longer pursuit of the subject is equally undeniable. I am also strongly of the opinion that this interest produces greater application or I should not continue the 'State' another year. Last winter several members of the class got into a discussion in the *Clarion*, the school paper, as to the relative merits of Cicero and Catiline. The charges, answers and counter-charges, involving the whole history of the *populares* party and the reforms of the Gracchi, continued for several weeks, indicating clearly that real independent thought had resulted. One pupil wrote a most interesting and unexpected comparison of the political proposals of 63 B. C. and 1912 A. D., comparing the parties and platforms."

These are a few of the experiments that are being tried for the purpose of applying in the schools the much advocated but little practised pedagogical maxim, "one learns by doing." The several plans which have been described differ somewhat in details but they agree in the principle of having the pupils, instead of the teacher, do the work. The success of the projects is due to

The common factor of success in these experiments



the motives to which appeal is made—to the racial impulse to contrive, to plan, in short to the instinct of workmanship in its broadest sense.

These plans of organization for doing the work of the school serve several purposes; they furnish **Their constructive importance** activities that satisfy the desire for adventure of which we spoke in the first chapter. It will be remembered that one of them successfully competed even with football for enthusiastic support of the pupils. While meeting this need they also further the purposes of the school. The children work harder in their studies and, in their simple way, they originate and investigate by reading more widely so as to make their personal contribution to the knowledge of the group. The pupils cease to imitate books and teacher. They move under their own power. Finally, these experiments keep the teachers alive at the growing point. They can not settle down into the ruts of monotony because each day presents new problems which the activity of the children has stirred up.

## CHAPTER IV

### PROGRESS IN LEARNING

**M**ANY books have been written on methods of teaching, but comparatively little has been said about methods of learning. While this was quite natural in view of our scant knowledge of child psychology, it has had the unfortunate effect of overemphasizing the arrangement and form of lesson plans. The method of lesson-presentation has been settled chiefly by reference to the subject-matter, and too often with inadequate comprehension by the teacher of the wider meaning of the facts which it contained. The logical arrangement of the parts of the topic for study and the importance from the teacher's view-point, of each portion of the whole, have determined the lesson's plan. But in acquiring knowledge, the logical arrangement is not always the pedagogical. The mind often apprehends ideas and things as wholes and analysis comes later. The discovery that children acquire words and sentences without the preliminary logical step of learning letters illustrates this principle. No amount of logical analysis would have ever planned a lesson in that way.

English grammar is another case in point. Probably there is no subject in the curriculum about

**Failure of logical  
method in teach-  
ing grammar**

which there is more confusion and less agreement. It is doubtful, also, whether any subject receives more time with worse results. The reason is that the logical method has been used. Grammar contains the syntax, conjugations and principles of the language; therefore it is a prerequisite of the written use of that language. Those who reason in this way, however, forget that language was spoken and written long before its grammar was put down in books. Some day an enterprising schoolmaster will teach children to write stories before they have studied grammar and then we shall find that youngsters can use forms of expression without preliminary rules just as we now know they read words and sentences before they have studied the letters which compose them.

We have been illustrating the two points of view in determining the method of the recitation. In teaching reading, the child him-  
**Laws of learning  
a recent discovery** self—the way in which he apperceives and assimilates knowledge—is the test of method, while in English grammar the logical analysis of the language continues to determine the practice of the schools. But belief that the value of a method is measured by the results obtained has been spreading among teachers lately and with its growth have arisen the related questions: How is knowledge acquired? Are there laws of learning? If there are they must surely enter into the discussion of method, since in rules for imparting

knowledge we can not ignore the ways in which the mind of the learner acts when receiving it. These questions have been answered by recent investigations. There are laws of learning. Thus far only a few of the more evident ones have been discovered, but these few when understood and applied must work great changes in schoolroom practice.

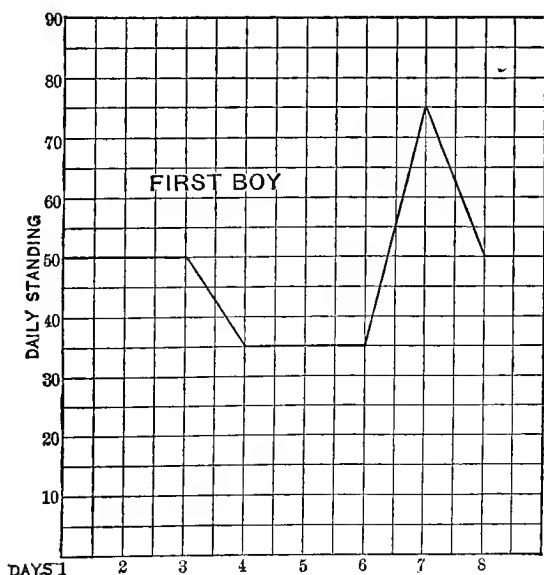
First of all there are general laws—laws which are true of all learning whatever may be the subject studied or the age of the learner—and, second, investigations show variations within these general laws. An illustration will make this clear.

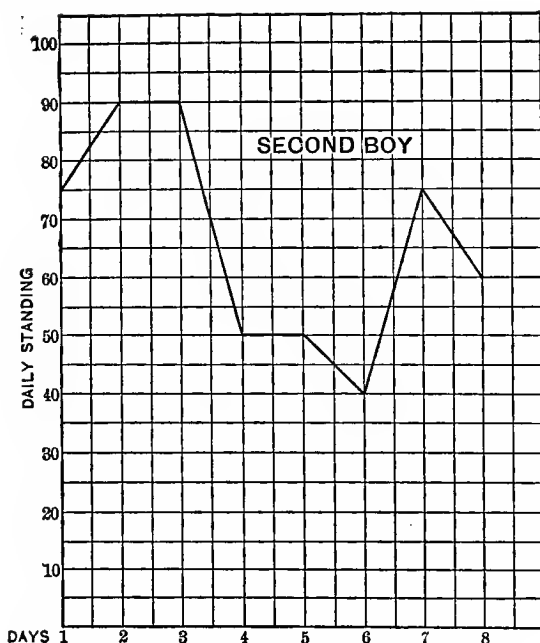
The progress of learning is always irregular. At times the learner advances steadily for several days, perhaps even for a week. Then the quality of his work drops suddenly, but it may rise again quite as unexpectedly as it fell. This irregularity of progress—advance alternating with inability to do the work—is one of the general laws of learning. It is true of every person and of every subject of study. But the length of the period of advance and the level to which the learner may drop, as well as the length of time during which he stays at the lower stage of efficiency, are all variations within the general law. In other words, if one hundred per cent. is perfect work, the beginner may make fifty per cent. for the first three days and then drop to thirty-five per cent. After

**General laws of learning and variations**

**Illustrations of irregularity of learning process**

showing grades to the value of thirty-five per cent. for three days he suddenly rises to seventy-five per cent. and then drops again to fifty. Again, another child in the same class may receive the following grades in the tests which we have supposed were taken by the first boy: seventy-five per cent., ninety, ninety, fifty, fifty, forty, seventy-five and sixty. Let us now represent the progress of these two boys during the eight days by curves, as the lines which show the daily progress are called. If we connect the points that represent each day's grades by straight lines, we have the following graphic representation of the progress of the two boys during the eight days.



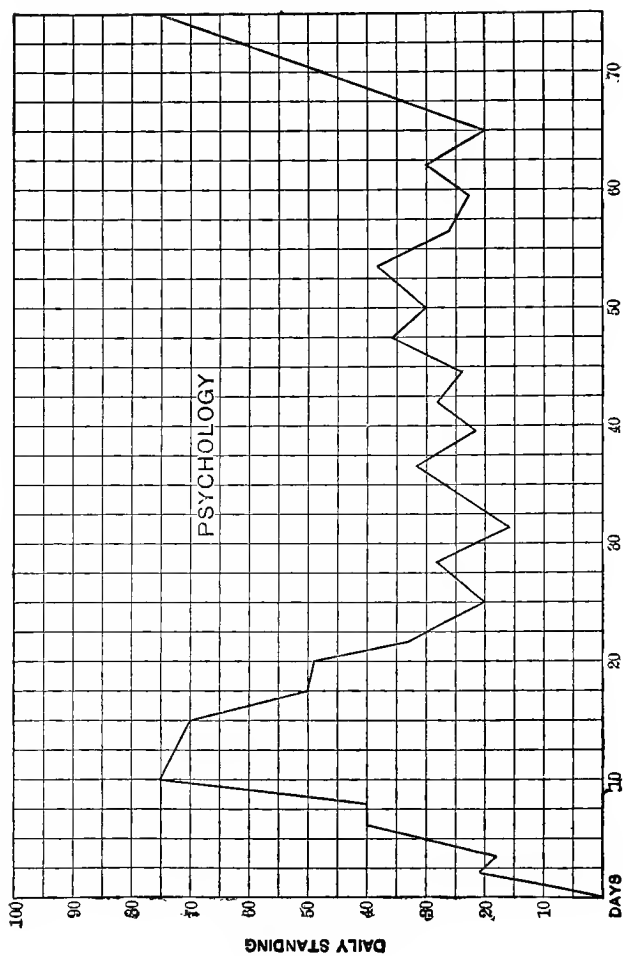


The grades for the boys on each of the eight days are given at the left of the curves and the Plateaus in learning process days beneath. It will be observed that both curves, though they have their individual characteristics, agree in being irregular, i. e., progress is never continuous, and they agree also in showing short periods when the learner remains stationary. These stationary periods—consecutive days during which the learner neither advances nor retrogrades noticeably—are called plateaus in the curve of learning.

So far, of course, we have said nothing that is new to teachers. Every one knows that the progress of children in their studies is not continuous. They do better on some days than on others. But the interesting fact in this connection is that these boys may have worked just as hard during each of the days on which they made such different grades and the lessons may have been equally difficult. The significance of these plateaus for the teacher, and the work that should be assigned while the learner is on them, will be discussed in the following chapter. Here we are concerned chiefly with the fact that plateaus inevitably occur in studying subjects in which the earlier work is essential for understanding what comes later. This is the case with such subjects as English grammar, arithmetic and all foreign languages.

Let us now examine the curves of progress which have been traced from the daily record of persons actually engaged in pursuing a subject of study. For several years the writer has kept the daily records for the first three months of members of his class in psychology. From these records a typical curve of the progress of beginners in that subject may be drawn. This curve is on the following page.

**Description of  
curve of learning  
from a psychol-  
ogy class**

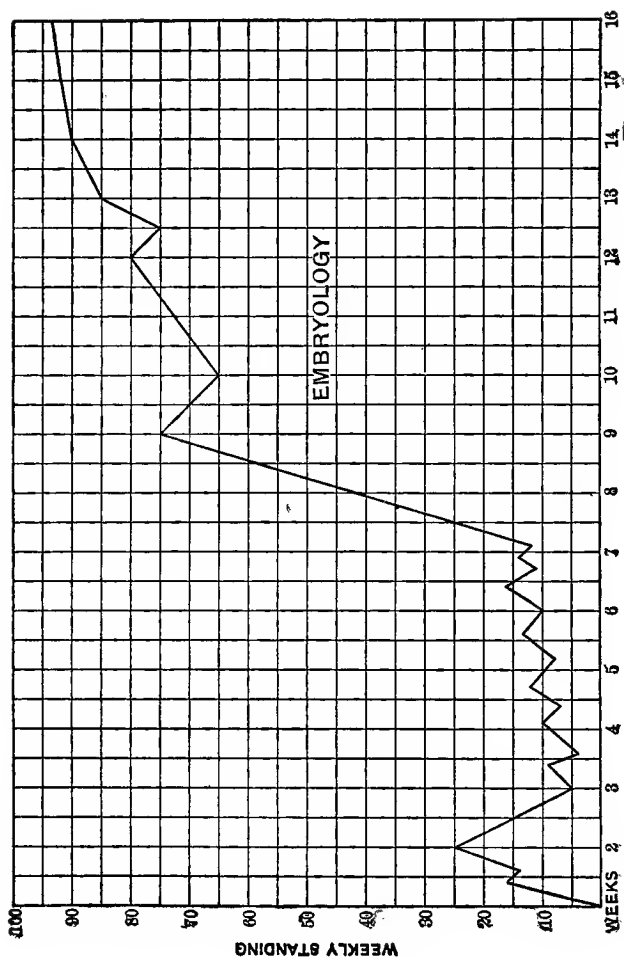




The curve shows that during the first ten days—namely, for the first five or six recitations—progress is pretty continuous and rapid. The reason for this is that the work consists in learning a few terms and definitions and in applying them. This is easy to do because at the beginning the complexities of the subject are carefully avoided. After about ten days, however, the work becomes more involved. It is now necessary to exercise nice discrimination in the use of terms and those students who have not thoroughly mastered the preliminary work become more or less confused. For this reason their marks go down quite steadily. The level that they reach will depend upon the accuracy of their knowledge of the preliminary statements of the book and lectures. Some do not go so low as the line in this curve while others continue their descent until they find themselves submerged and unable to remain in the class. A few drop hardly at all. Their progress is irregular, they go up and down according to their physical condition and the amount of study given to a day's assignment, but at no time do they go very low.

In embryology, the introductory concepts are not difficult but, owing to the simultaneous differentiation of different systems of organs, so many new facts must be mastered that it is difficult to keep all of the details in mind and to hold them in their proper relation. Significant and secondary points

**Explanation of  
the curve for  
embryology**



are not easily organized and appreciated. The student can not see the woods for the trees. Further, in his microscopic work the pupil must usually acquire a new mental habit—that of thinking things in three dimensions while seeing them in two dimensions under the microscope. Consequently, for several weeks everything is confused and this confusion is likely to continue until repetition renders certain phenomena familiar. After a period of mental digestion, which can not be hurried, the student who works persistently succeeds in detaching himself from his subject and in viewing it at arm's length, so to speak. Then ideas that previously were difficult to correlate fall into place and difficulties disappear. This is the time when the visible advance begins.\*

It seems evident that the rate of progress, the number and length of plateaus, indeed whether there will be any retardation at all, depend on the nature of the task and fitness of learner and fitness of the learner for the work. This, of course, presupposes continuous and persistent effort, a condition that occurs only occasionally in children.

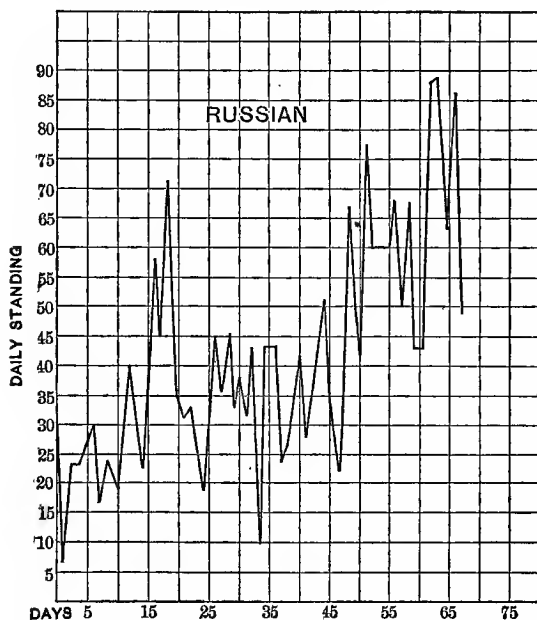
The curve which follows shows the progress of the writer in learning to translate sentences from the Russian language, with which he was wholly unacquainted. The

**An experiment in learning Russian**

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\* The writer is indebted to his colleague, Professor J. F. Abbott, for the curve in embryology and for the explanation of its peculiarities.

preparation for this experiment consisted in two hours' work on the Russian alphabet. The experiment was then begun. This consisted of thirty minutes' daily study followed immediately by a fifteen minutes' test of reading ability. The Russian sentences in each lesson were the test material for the day's reading. The preliminary study of thirty minutes was carried on in the manner customary with a foreign language. The time was divided between the vocabulary, conjugations, declensions and practice, in reading review exercises.



\* This curve is taken from the author's *Mind in the Making*, by permission of Charles Scribner's Sons.

A part of the amazing irregularity of this curve is probably due to the fact that, since the work was done without a teacher, there was no one to assist the learner to find a puzzling word or to straighten out a perplexing construction. The occurrence of difficulties of this sort caused the curve to drop suddenly and it rose quite as quickly when the solution was found. Evidently we have here an explanation of the startling variation in scholarship of individual pupils which so often puzzles teachers. Assistance was not at hand when it was needed and an unnecessary drop occurred in the curve of progress. We shall discuss profitable and unprofitable help in the following chapter. It is sufficient here to observe the effect on progress of groping one's way through a maze of unfamiliar facts and statements. This is a condition not unknown in the schools.

Aside from the striking daily variation in the curve for Russian, these three curves have the same general peculiarities as the imagined cases shown on an earlier page. Progress is never continuous, but always by jumps. There are days when the learner seems to make no gain and then, perhaps, he leaps forward. He may now hold his own or he may drop back again. But if he loses his hold it is not long before he regains it and then he makes this higher level the starting-point for further advance. This irregularity of the learning process, plateaus — stationary periods — alternating with

**Similarity in results of two experiments**

progress or retrogression, has been found by all investigators.

What is the relation of the highest and lowest mark attained on a given day to the actual ability of the learner in the subject at which he is working? Clearly neither **Relation of high score to learner's rate of progress** one represents his stage of progress. Nor, again, is the pupil's grade half-way between the two "scores." If we bar out chance, which, of course, occasionally influences grades, the highest score or grade, while always above the learner's ability at the moment, shows the direction in which he is moving and bears some relation to his rate of progress. The learner may not permanently reach the level of his best grade on the following day, but, if he works persistently, he will shortly approximate it and make it his own very soon.

Ability to maintain a grade once attained is, of course, closely connected with the power to sustain **Variations in maximum effort** a maximum degree of effort, and the writer's investigations have shown that this is impossible. The work may go so easily as to cause the learner to drop, perhaps unconsciously, into a state of relaxation and, again, the difficulty or monotony of the task may have the same effect.\* Maximum effort, indeed, is a variable quantity in a given individual. The writer's ex-

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\* *Acquisition of Skill in Typewriting*, by Edgar James Swift, *Psychological Bulletin*, Vol. 1, p. 299.

periments show frequent variation in "fitness" for the work in hand. Fatigue from any cause, bad air or high temperature in the room and emotional disturbance, such as excitement, lower the result of maximum effort if not the effort itself. Indeed, one's "feelings" regarding one's fitness are not always reliable. The writer, to his great surprise, made an exceptionally low score in typewriting on a day when he felt unusually fit. A most interesting illustration of this was the case of one of the participants in the feat of tossing three balls into the air, catching each in turn as it descended, and tossing it up again before the others reached the hands. He had made seven hundred thirty catches on his fifth day and on the sixth he felt confident that he would reach his thousand mark. But, after starting, he was unable to control his muscles and, instead of gaining he fell to four hundred thirty-one. "What had been easy the day before was now done only with the greatest effort, and at the conclusion of the afternoon's work, he was in an uncontrollable tremble."\*

The effect of physical condition on progress was also observed by Miss Munn.† She found in her investigation that "one little girl with a hard cold required as long to finish three trials as she had previously required

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\* *Studies in the Psychology and Physiology of Learning*, by Edgar James Swift, *American Journal of Psychology*, Vol. 14, p. 215.

† *Archives of Psychology*, No. 12, March, 1909, p. 36.

to complete ten." The most noticeable disturbance caused by the physical condition, she says, was in the nervousness which followed inability to do the work in quick time. Then, too, if the room was warm progress was much slower than usual; if too cold the same effect was observed. Fatigue, Miss Munn adds, had the same result. "After an afternoon spent almost entirely in drawing, the tests were taken and the weariness of the children influenced the rate of progress greatly. Their interest in the doing of the tests was much less than it previously had been and the gains they made interested them little. It was only with much coaxing and encouragement that they were able to be kept long enough to finish the tests." In addition to times of more or less serious physical disability, there are also "off days" when one is not at his best. Without doubt this condition has its physiological basis but the causes can not always be detected.

A "warming up" period is frequently necessary. A little introspection will convince adults of this "Warming up" period in their own physical exercise and mental work. A tennis player rarely does his best at the beginning of the game. It is true, the first ball may be well placed, but the record is not maintained until he has been playing a short time. A writer of much experience once said that he always "lost time" in beginning his work. This "warming up" when once accomplished may



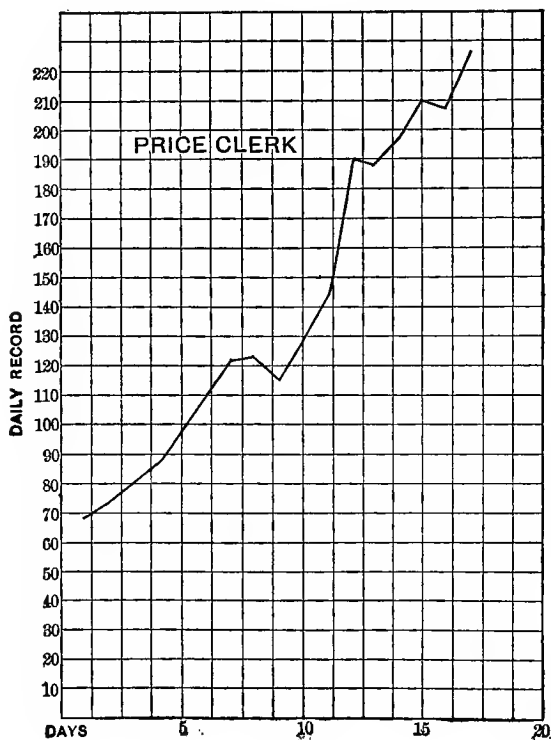
sometimes be carried over at least a brief period of inactivity. Indeed, an intermission is sometimes of assistance, though, as we shall find in the following chapter, intervening mental work of a different sort may be a disturbance.

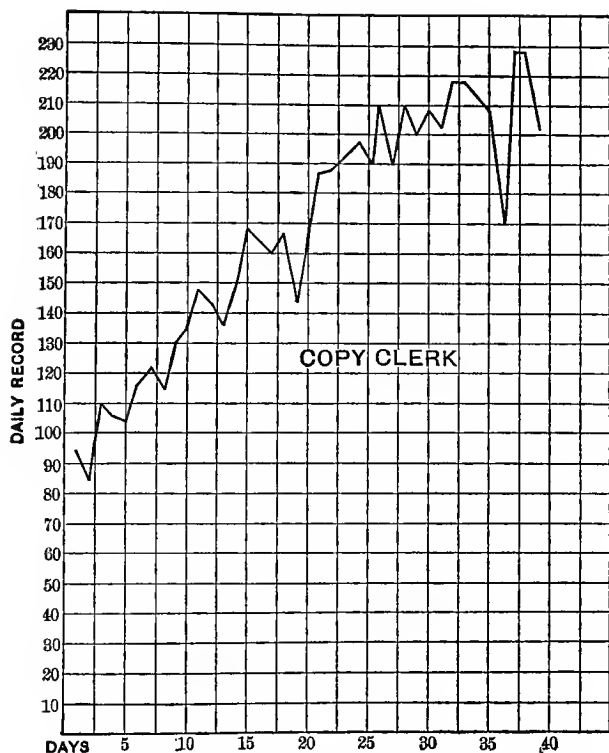
The question may be raised, however, whether the peculiarities in the learning curve, which we have found, characterize all learning. Perhaps school learning is in a class by itself. Indeed, one sometimes hears remarks to that effect. In order, therefore, to ascertain whether learners under other conditions exhibit the same irregularity the writer obtained the records of a price clerk and a copy clerk from a large wholesale hardware company. These records were taken at random and represent the rate of progress when the work was being learned. A brief description of the nature of this work is, perhaps, desirable.

**Description of  
methods of  
the firm**

for the articles sold, looks up the cost and enters the extension of the cost price. As an example of the number of a single article he may be obliged to look through before he becomes familiar with the price list, this hardware company lists over four hundred fifty hinges. Then, again, the customer may ask for a brass hinge which, with this company, is listed under "butts." A beginner must, also, do

considerable mental or written reckoning. For example, one-twelfth of a dozen at nine dollars is seventy-five cents. As the clerk gains proficiency these fractional prices gradually become matters of memory. Skill in finding the items in the price book is also to be acquired and the difficulty of this may be appreciated from the fact that the price book of the company from which the records were secured





contains one thousand thirty-eight pages in which are listed approximately seventy-five thousand items.

The copy clerks copy invoices from order sheets which have been checked by the price clerks. They must gain sufficient familiarity with the items to be able to recognize them in all sorts of handwriting and abbreviations.

It will be noticed at once that these curves have

the same general characteristics as the curves which were shown before. Irregularity and one or more plateaus mark their course. Yet those from whom these records were taken had all of the incentives to acquire skill rapidly which desire for success in a new position can bring to bear. Increase of salary and promotion are effective spurs to effort.

Besides the causes of irregularity and retardation, to which reference has been made, monotony is always one of the resistances to be overcome in learning. In beginning a new study or new work of any sort the novelty awakens interest. At this stage, also, progress is relatively rapid because the learner begins at the zero stage of knowledge in the subject and the preliminary information accumulates quickly. Very soon, however, this mass of loosely organized facts becomes a source of confusion and discouragement and then the feeling of monotony is likely to dominate. All investigators of the learning process agree that success and pleasure accompany each other. It is improbable that one of these two always precedes and causes the other. Either one may come first; but there is always interaction between them, each tending to increase the other. The writer found in his experiments on adults that the desire to excel one's own record as well as that of one's coworkers, was often an incentive to better

work and that monotony was relieved at the same time. Similar observations have been made by Thorndike and Miss Munn in experiments with children. "The children were very anxious to know the progress they were making and how it compared with that of their friends." "Encouragement," Miss Munn says, "did much in raising the record and the trying to outdo their friends held the interest of the children and proved the best incentive to doing the work."\* Thorndike, in speaking of this, says that "the amount of improvement in this experiment" (which he had just made) "may also add to our confidence that the method of the practice experiment wherein one works at one's limit and competes with one's own past record, may well be made a feature in many school drills."†

The factors which enter into the learning process do not keep pace with one another. Progress is by sections. In all of the experiments which the writer has made, errors of one sort persisted after those of another kind had been largely eliminated. In other words, certain factors essential to success became fairly automatic in advance of others. Then, perhaps, no progress would be noticed in the first for a time and the backward ones would develop. Evidently, children should not be expected to make even progress in all of the mental processes

**Uneven progress  
of the mental  
processes**

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\* *Archives of Psychology*, No. 12, March, 1909, p. 36.

† *American Journal of Psychology*, Vol. 21, p. 482.

that make for proficiency in a given school subject. In grammar, for example, the pupils may gain considerable skill in the use of adjective phrases and clauses while making no apparent progress in the more complex adverbial expressions.

In all of the investigations which the writer has made the learners improved by coming upon better ways of working without any further conscious selection, at first, than the general effort to succeed. "The process is subconscious. The learner suddenly finds himself doing something of which he has not before been aware. The new acquisition is well along, however, before it is discovered."\* This unconscious improvement has since been verified by several investigators. On account of the importance of this factor in the learning process it may be well to quote from some of the later investigations. "A second significant fact about learning is that all adaptations and short-cuts in method were unconsciously made, that is, fallen into by the learners quite unconsciously on the good days while practising under strain. The learners suddenly noticed that they were doing certain parts of the work in a new and better way, then purposely adopted it in the future."† Again, "a large percentage of the

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\* *Psychological Bulletin*, Vol. I, p. 305. See also *Studies in the Psychology and Physiology of Learning* (Swift), *American Journal of Psychology*, Vol. 14, pp. 218-219.

† *The Psychology of Skill*, by W. F. Book, *Bulletin No. 53*, University of Montana, p. 95.

fortunate variations came altogether unpremeditatedly," is the way in which Ruger phrases it in his *Psychology of Efficiency*.<sup>\*</sup> Finally, Louise Ellison Ordahl found, in her study of *Consciousness in Relation to Learning*,<sup>†</sup> that methods changed and improvement appeared without conscious control. Unconscious modifications were continually cropping out. As consciousness was more and more freed from details these modifications were noticed, practised and improved upon. "Practice results in a standing out of the common features of the process; these are focalized and generalized into rules for new and better procedure, which immediately takes place."

Learning always involves the acquisition of certain habits which vary with the nature of the thing that is being learned. In manual **Progress through elimination of the useless** feats of skill, for example, the habits are muscular, chiefly arm and finger movements, while in such work as shorthand writing and typewriting, both muscular and mental habits are involved. In the latter instances the mental habits vary from the simple ones of beginners of focalizing the parts of each symbol, in the one case, and each letter, in the other, to the more economical habits of the expert who writes each symbol or letter automatically without focalizing the elemental parts that enter into the sign.

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<sup>\*</sup> *Archives of Psychology*, No. 15, June, 1910, p. 1.

<sup>†</sup> *American Journal of Psychology*, Vol. 22, p. 158.

The learning process at the beginning includes much that is useless and its gradual growth toward economy of effort consists in eliminating these accessories. In learning to write, for example, nervous currents go out through many muscles which have no place in writing. The child thrusts out his tongue, jerks his head and legs and, indeed, squirms with his whole body. This is not only uneconomical from the standpoint of securing results, it is also fatiguing. Learning aims at economy of effort. This is the explanation of the unconscious adoption of new and better ways of doing the thing one is practising, to which we have just referred. There is always a tendency to shorten the process—to eliminate what is unnecessary. The boy who is learning to write finally reaches the stage where he is not conscious of letters or even words. These have been cut out in the short-cut process, and the idea expressed by the sentence is sufficient to produce all of the movements necessary to write the letters.

In learning a new language the declensions and conjugations are finally cut out from the act of translating and the learner comes to use nouns and verbs correctly without thinking of their endings or forms. Bryan and Harter have introduced the terms higher and lower orders of habits to describe these elemental and perfected ways of working, and the distinction



is a good one. The lower-order habits are those of attention to details and these must become automatic before the attention is free to deal with the higher-order which efficiency requires. As long as a learner is obliged to give attention to the form and endings of words he will find it difficult to remember what he has read or even to understand its meaning. This is the reason why we read a foreign language slowly. Until we have become as proficient in the language as we are in our own we are obliged to give attention to forms of words and construction of sentences.

Investigations have shown that there is always a tendency in beginners to drop back into the lower-order habits even after some facility has been gained in the use of the higher habits. The value of speed in preventing this and placing the learner permanently on the higher level is in some dispute. Book believes in pushing one's self to the limit but Miss Munn\* and Bair† found more errors with great effort at speed. There is no question, of course, that the learner should work vigorously, but this is quite different from straining to attain the greatest possible speed. With children, at any rate, it is doubtful whether continuous strain is wise on account of the nervousness that accompanies it.

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\* *Loc. cit.*

† *Psychological Review, Monograph Supplement*, Vol. 5, p. 5.

Nervousness is not usually attended with accuracy, and accuracy is vital to the attainment of efficient higher-order habits.

Let us now pass to another phase of the psychology of learning. In commencing a new subject, as English grammar or Latin, **Plateaus as periods of assimilation** beginners, during the first few weeks, acquire a mass of information which must be so completely assimilated that its use becomes as automatic as the movements of balancing the body in walking. Now this requires time and, as a matter of fact, the information accumulates faster than it can be assimilated. During the time when this information is being organized into usable knowledge and when definitions, rules, principles and, in languages, declensions and conjugations are becoming automatic, the learner seems to make no advance. The cause of these stationary periods in visible progress, which are called plateaus, in the opinion of the writer, is the need of time for assimilation and automatization.\* They are periods when marks tell only a part of the truth. Though there is no visible advance, real progress, nevertheless, is going on in organizing the chaotic mass of facts and bits of disconnected information which the

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\* See *Studies in the Psychology and Physiology of Learning*. Loc. cit.; *The Acquisition of Skill in Typewriting*, *Psychological Bulletin*, Vol. I, p. 295. *Beginning a Language*, (in *Studies in Philosophy and Psychology*, Garman Commemorative Volume), and *Mind in the Making* (Swift), Chapter VI.

learner has acquired so that they may be used quickly and accurately.

Miss Munn,\* in her study of the learning process, came to this same conclusion. "But this period of standstill is not truly one of no gain," she says in summing up, "for after these resting periods, as we may call them, great gains are frequently made and also kept. It seems as though we might call them periods of assimilation, for the acceleration which follows shows that some learning must have been going on or otherwise the sudden gains would not have ensued." Cleveland, also, seems to have the same thought in mind when he says, in his study of the *Psychology of Chess and of Learning to Play It*, that "the most important psychological feature in the learning of chess (and it seems equally true of all learning), is the *progressive organization of knowledge*, making possible the direction of the player's attention to the relations of larger and more complex units. The organization involves generalization . . . and the multiplication of associations; it insures prompter recall and increased potential meaning in the general concepts; it releases attention from details and favors consequent mental automatisms and short-circuit processes. Thus alone is progress possible. Mental automatisms are usually perfected, one may

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\* *Loc. cit.*

conjecture, after advance to the next higher stage of learning.”\*

Book, on the other hand, believes that plateaus in the learning process “represent either a failure in attention and effort . . . or a period during which attention and effort are wrongly applied, where mistakes are multiplied and where subsequently the evil effects of practice in error are slowly overcome and right habits of attention and execution regained.”†

Miss Munn has proved the inadequacy of this explanation by showing that after these periods of no apparent progress “great gains are frequently made and also kept.” Why should the attention almost invariably select the moment for lapsing when the learner is on the point of making decided improvement? And, again, why should the attention on suddenly returning to its duty impart a skill greater than it gave during its former period of full activity before the cessation of progress? The improvement that follows the retardation must be accounted for, and the rapid rise of the curves after these plateaus indicates that some sort of mental organization and automatization has been going on during the interval of retardation in visible progress.‡

Finally, time is an important factor in the learn-

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\* *American Journal of Psychology*, Vol. 18, p. 269.

† *Loc. cit.*, p. 157.

‡ See also the writer's *Learning to Telegraph*, *Psychological Bulletin*, Vol. 7, p. 149.

ing process. This is only another phase of the periods of retardation which we have just considered. Plateaus in learning are the mind's protest against further cramming. Time is needed for the associations—and the nervous currents underlying them—to become fixed. We have the same fact illustrated in another way. Müller and Pilzecker found\* that, if those who had learned a given assignment turned their attention to something else immediately after committing the assignment to memory, the result was by no means so good as when they rested quietly for five or six minutes without thinking of anything in particular. It should be emphasized, however, that, during this brief intermission, the learners did not think about what they had just studied. Further, the closer one applies one's self to a new task immediately after finishing a piece of work, the less of what one has learned will be remembered. The explanation, these investigators believe, may be something like the following. After studying a given assignment certain nervous processes which tend to strengthen the associations started by the act of learning, continue in force for a time, but with decreasing strength. In the opinion of the present writer, turning immediately to new work disturbs these nervous processes both by starting interfering currents and by draining off those which, if given

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\* *Experimentelle Beiträge zur Lehre vom Gedächtnis.*

time, would establish the associations produced in learning the assignment.

That nervous processes once associated through an act of learning do actually become "set" during

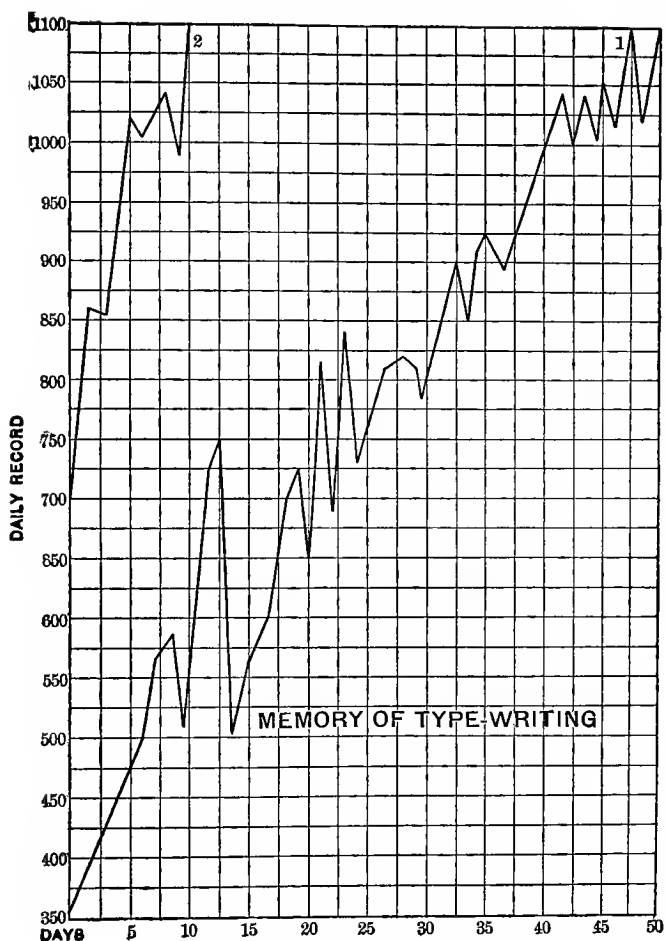
**A memory  
experiment**

cessation of practice has been demonstrated by experiments of the writer on memory.\* These memory tests were made in typewriting and ball-tossing. The first occurred two years and thirty-five days after the regular practice on the typewriter had ended. During the interval the writer had not touched any style of typewriter until one week before the test of which we are now speaking, when he wrote a letter of about fifty words. The memory test in ball-tossing was taken six years and seventeen days after the conclusion of a series of experiments by which the skill was first acquired.

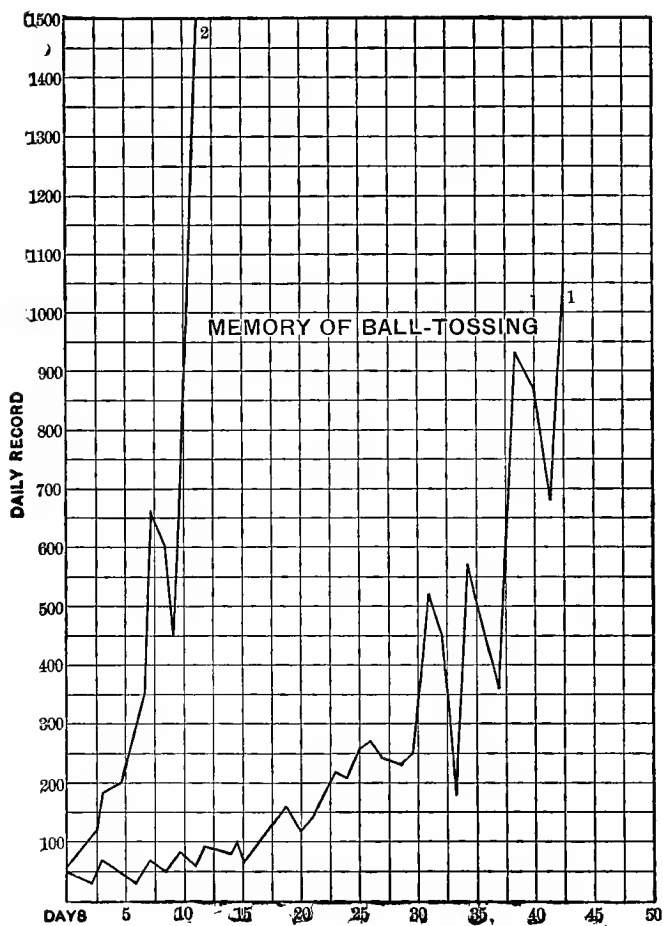
In order that the significance of the memory curves may be clearer the original curves showing the progress in the regular learning practice in typewriting and in ball-tossing—the one more than two years and the other a little over six years earlier—are also given. In both cases curve 1 is the regular learning curve and 2 is the memory curve. As before, the days of practice are indicated under the base line and the rate of progress at the left of the curves.

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\* These experiments verify earlier ones made by B. Bourdon. See *L'Année Psychologique*, Vol. 8, p. 327.



\* The curves for typewriting and ball-tossing are taken from *Mind in the Making*, by permission of Charles Scribner's Sons.





As will be seen from the curves in typewriting, the original investigation covered a period of fifty days, while in the memory test only eleven days were required to reach the degree of proficiency with which the original investigation closed. Practice was omitted, however, on five of the original practice days and once during the memory test. The actual number of days of work was, therefore, forty-five in the former and ten in the latter.

**Comparison of  
original experi-  
ment and mem-  
ory test**

In ball-tossing, eleven days were needed to regain the skill which, in the earlier work, had required forty-two days of practice. At the conclusion of this memory test the experimenter had attained a skill of sixteen hundred catches in ten misses, against ten hundred and fifty-one in the earlier work. That he actually had more skill than at the end of the practice of the first investigation was also indicated by the feeling of greater ease in making the score.\*

The facts in the psychology of learning which we have been considering have pedagogical significance to which we now turn.

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\* For the details of these experiments see the *Psychological Bulletin*, Vol. 1, p. 295, and the *American Journal of Psychology*, Vol. 16, p. 131.

## CHAPTER V,

### ECONOMY IN LEARNING

ONE of the advantages of studying the learning process we have found to be the shifting of the teacher's attention from the subjects of study to the pupils. For example, the usual method of determining the amount of work to be taken each day is to divide, as equitably as possible, what must be finished in the term. Studies in learning have shown, however, that there are days when children can accomplish many times as much as on other days. Sometimes this is caused by the physical condition of the children, but, again, it may be the result of the excitement of the day. So the teacher now makes the children his starting-point in determining the amount to be taken in the lesson and frequently, indeed, in deciding whether any studying at all may profitably be attempted. An illustration of the latter case is seen on days of football matches or when some other great excitement stirs the school. The children may, of course, be compelled to mark time in their books but it is often a question whether more progress would not ultimately be made if, at such a time, some other

sort of work were done with sufficient interest in it to hold the pupils.

This does not mean to change the order of the day for every childish whim, but economy in learning—which means securing the best results in the course of the year—can not ignore the attitude of hostility or friendliness of pupils toward their teachers and their work; and this attitude is determined by the feeling of the teacher toward the things which the children prize so highly, or, rather, by the feeling which the children think their teachers have. The latter is quite different from the former, as every teacher knows from his efforts to be understood. How, then, are the children to be convinced of the teacher's friendliness? By giving the things which children take so seriously a place among the valued activities of the school.

Standing in the court of educational method is granted rather grudgingly to children. A writer in a recent number of the *Atlantic Monthly*\* has said that “The firm old belief that the task is a valuable asset in education, that the making of a good job out of a given piece of work is about the highest thing on earth, has lost its hold upon the world. . . . All knowledge, we are told, can be made so attractive—if only we have a very up-

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\* *Our Loss of Nerve*, by Agnes Repplier, Sept. 1913.

to-date teacher—that children will absorb it with delight.” This way of arguing is strikingly suggestive of the Indian device for frightening an enemy. Before going on the war-path, they painted themselves in hideous colors so as to look as fierce as possible. To-day, those who would oppose a new idea paint it in gloomy tints and do not hesitate to distort its meaning if by so doing they can create alarm and produce a literary effect.

There are only two possible courses according to the tacit assumption of writers such as we have quoted. If children are to make a good job out of a given piece of work they must be told to do it and then be held at the task until it is done. The other alternative is to cajole the youthful tyrants into doing as much as possible and, when beguilement fails, to give them other work in the hope of finding something that will satisfy their royal pleasure. The latter plan, as we are led to think, is the method of the “very up-to-date teacher” and with it comes “our loss of nerve.”

Now the present writer ventures to assert that a third way is open. First of all it should be remembered that work may be pleasant without being easy. It is, of course, supremely important in educating children to train them to keep at a task until it is finished. There is no disagreement about this, but the problem is how to accomplish it. The primitive way

was to order things done and to punish failure and disobedience. Teachers early adopted this method because it was approved by tradition and because at that time knowledge of child psychology was lacking. Now, however, we have learned that children can be made to want to do what we wish provided we know their ways of responding to given conditions. There is no special virtue in creating unnecessary friction merely to make children work against it. Habits of ethical, social conduct and of industry are what are wanted and when once these habits are established children are better prepared than before to resist temptations and to overcome obstacles. In practice we accept this principle by establishing public playgrounds to shield children from the temptations of the streets. If, however, we apply here the criticism of such writers as we have quoted we are causing "loss of nerve" by shielding these children from these moral perils instead of compelling them to conquer the dangers.

The purpose in establishing public playgrounds is to create situations which shall save children from

<b>The alliance between teacher and child</b>	temptations for which they are not ready and, meanwhile, to train them in habits of self-control.
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Now if we interpret this for the schools it means that we ought to plan situations which shall protect pupils from the allurements of things and actions more seductive to them than study, while at the same time we are training them in habits

of attention and industry. In this way they are gaining the self-control that, later, will enable them to hold their own against persuasive attractions. This is done by applying the psychology of the group—the gang—and by utilizing the willingness of children to accept responsibility when it is put upon them. To get children into the habit of doing a given piece of work is what is wanted and if this habit can be produced by creating in them a feeling of friendliness to the school through recognition of their own activities and by helping them organize into groups to bring the spirit of the gang to the teacher's side, the training in self-control and in industry has been well started. There is infinitely more moral and industrial value to the child in eagerness to undertake a difficult piece of work than in "unwilling study," and the teacher who can produce this eagerness has succeeded far ahead of him who commands and drives. Would any one maintain that the school in which the teacher holds the children to their tasks by fear of penalties is superior to the one in which the pupils study from the joy of contributing something to a common cause, or that the habits gained in unwilling study are a more valuable asset than those acquired through joy in work? Is not one of the problems of the school to teach children to want to study, to enjoy history, literature and science so that they may wish to pursue each further when they have left the school?

We have been trying to show that the cooperation of children in furthering their education should be the aim and that the value of their training is greatly enhanced and its permanency better secured by entering into an alliance with their racial instincts and native interests. This includes not merely the instinct of workmanship, powerfully entrenched as it is in the life of the race, but also the instinct of play, the moments of intense enthusiasm for the free, wild life of action in other things than studies. Recognition of these interests on the occasional days when events of temporarily supreme importance bring them to the front unites the interests of teachers and pupils and, in the course of the year, greatly increases the efficiency of the work.

Undivided attention to the work in hand is what counts and there are days when children can not give it. To attempt at such a time to hold them to their books is but to break the incipient habits of study which have been weeks in starting. One of the rules for breaking bad habits is not to permit a single fall from grace. This is, of course, impossible with children, and teachers, in their enthusiasm, may place the pupils in such conditions that failure is practically certain. By recognizing these facts and studying the needs of the pupils one may, on the other hand, not only promote habits of study but also create the feeling of good will which is essential

to progress in the work. For all investigations have shown that the attitude of the learner toward his task is vital to success. This attitude influences the height of the curve. Children who are not well disposed toward their teacher and the school will never do their best. They will have their ups and downs, just as do the others, but the highest point attained will not be commensurate with their abilities.

The experiments given in the third chapter are some of the plans which have been tried for creating this feeling of good will. **Importance of group sentiment** Their success was due to their appeal to the children's point of view. They offered new activities which the children themselves could manage and so this organized pupil-work set up rival interests, interests quite as absorbing in certain respects as the outdoor sports and which, at the same time, stimulated progress in the studies. In addition, these methods of enlisting the help of the pupils appeal to the instinct of group action—the gregariousness of lower animals—and it is always easier to guide the interests of groups of children than to manage individuals. This is an important fact in school management. The teacher should plan to produce a group sentiment of industry and loyalty and mutual helpfulness. But the less he uses these words the better. Boys abominate cant and sentimentality, and the repetition of platitudes is more likely to cause mirth than serious



thought. Whether they do or do not will depend on whether the feeling, of which we have been speaking, pervades the school; and so, at all events, the development of a feeling of good will through action instead of words is the first requirement.

Everything that various writers have said about the "gang" applies here.\* The leader of the boys

**Importance of winning leader of the gang** is, of course, to be discovered and won. He is the one through whom suggestions may be spread

quickly among the pupils. He is proud of his position of influence among his fellows and this feeling of superiority is his vulnerable point. What method is to be employed in winning him? Human nature is too variable for specific rules, but such boys always like to have their opinion asked, and if the teacher can get them to do him a favor they are usually his allies in the future. It is difficult for any one who has helped you once to turn against you. But the teacher must always be frank and open in dealing with the leader, as indeed with all of his pupils. Everything "on the square" is essential to success in the schoolroom as everywhere else. It is amazing how the leader, and through him the others, respond to friendly criticism when once the "gang spirit" has been run into channels for turning the wheels of the school activities. The feeling of group solidarity is perhaps the strongest force in boys, and its utilization

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\* See also, the writer's *Youth and the Race*, Chap. VII.

in creating the good feeling which promotes work is proof of teaching ability.

We have been speaking of boys because the problems of discipline and efficient work usually center in them. Girls are less aggressive and more imitative. If the boys are won the girls quite readily adapt themselves to the situation. The only exception is a girl who stands out conspicuously as a leader. In such a case her support must, of course, be gained. The motives put before her will frequently differ from those which are effective with boys. Probably the incentives to action should be more personal. With both boys and girls recognition of the racial craving for activities which the children themselves control, observance of their desire to participate at times in something tinged with the zest of adventure, and thoughtfulness of the danger of monotony, will do much toward diffusing a stimulating emotional atmosphere throughout the room.

This general attitude is disclosed in what may be called the spirit of the school and the thoughtful teacher now studies his children to discover the effect of each environmental factor, and this includes conditions of the home as well as circumstances and events in school. The progress of learners in their studies has been found unexpectedly sensitive to external conditions as well as to the physiological and mental condition of the children. Every teacher

is trying, of course, to get results—to produce such conditions as will help his pupils to make the best progress—and the study of the learning process, together with all of the conditions which affect it, aids him in this endeavor.

We have been speaking of the general attitude of pupils, which affects the learning curve of the entire school. It remains to show the influence of temporary states of mind or body on individuals.

The writer, throughout his experiments, found the feelings and physical condition of the learners to be essential to progress. They

**Progress depend-  
ent on bodily  
and mental condi-  
tion of learner**

were the fundamental requirement of efficiency. Book\* says, concerning this, that in his investigations the “correlation between the learner’s general affective tone or attitude and the fluctuations in attention and effort was so close that if one had a complete and accurate record of the changes that occurred in the former, one would have an accurate criterion of (the learner’s) progress and efficiency. The learner’s mental attitude and general tone of feeling was a true index of his progress and ability to do.” “The feelings and the failure of attention,” again, “were clearly joint effects of certain health conditions” and “the influence of the learner’s general physiological condition on (feeling and success) can hardly be overemphasized.” When in good physical condition and working vigorously,

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\* *Loc. cit.*, p. 149.

the writer's experiments, as we have seen, show that the learner adopts new ways and modifies his mode of procedure without knowing that he is doing it. After the change is made he finds that he is following a better method and then he consciously approves and continues it. But this unconscious utilization of better ways occurs only when the learner has zeal for his work; and zeal, though it may not always accompany emotional and physical good feeling, rarely exists without it.

These observations about adults apply equally well to the schoolroom. If a child is not physically "fit," keeping him at his work does little more than strengthen habits of inattention and nullify previous training by multiplying errors. The child actually loses ground on account of the occurrence of numberless errors which, as incipient habits, start interfering movements or ideas on following days. These errors are so many new resistances to be overcome when the child is in better trim. Every wrong association sets up an interference with the one that is right, and the more numerous the errors the greater the odds against the right ideas being brought into the mind through associative processes. The working of association is, after all, not very different from that of mechanical forces. Like the latter the various nervous currents which underlie the association of ideas follow paths of least resistance and it frequently requires

but little to divert the course of a gently flowing stream. To be more specific, we know how difficult it often is for even adults to spell a word correctly after hearing several incorrect suggestions.

But there is still another way in which emotional and physical unfitness make execution bad.

**Physical unfitness a cause of reversion to lower order of habits** If the beginner has acquired some facility in habits of a higher order he now drops back into elemental modes of work. Suppose, for example, a pupil in Latin has acquired some little skill in sight translation. This, of course, involves the beginnings of complex habits which, at their best, give evidence of a high degree of efficiency. The learner now sees the meaning of entire sentences without analyzing their parts or thinking in terms of case endings. On days of physical indisposition he will be reduced to the word method of the earlier stage. Or, again, if a child has learned to work in mental arithmetic he will be compelled at such a time to write out the solution of his problems because he can not hold the figures in his mind; and with it all mistakes will be common.

Economy in learning, as in all production, involves the quality, quantity and cost of the output, and physical or mental unfitness gives a limited quantity of inferior goods at a high cost. The increased expense

of production is caused by the bad condition of the machinery that does the work. The problem of the teacher here is much the same as that of a manager of a business house. When a leakage is discovered find the cause and stop it. In the present instance the state of the body and mind produces inattention, multiplies errors and reduces the pupils to elemental stages of learning. This reduces the output for the day. In addition, it injures the mental machinery by strengthening habits of inattention, by starting interfering nervous currents, on account of the errors made, and by perpetuating the lower-order habits of work. Recognition of children's mental and physical ailments avoids this waste and, besides, creates the general feeling of good will of which we spoke in the beginning. In other words, it produces the condition which experiments have shown to be necessary for mental efficiency. It were better to be deceived sometimes than give the impression of unconcern for those in trouble. When, however, the feeling of good will prevails, deception is in less favor. The children are likely to take care of that as we have found them resentful of other sorts of indolence. Successful shirkers are popular only in schools made up of two camps—the pupils and teacher—each in a state of armed truce and both watchful of each other.

This is not a plea for less work but for more efficient use of time. Greater advantage should be

**A plea for more efficient use of time, with a physiological explanation**

taken of the periods following the "warming up." This delay in getting started is an unavoidable factor in beginning the day's work in any subject. It probably consists, in part, in connecting the thoughts of the previous day as far as they enter into the task of the moment, and in part, in switching nervous currents into new channels. There is a complete break between geography and arithmetic. The learner must, so to speak, stop mental action and make a new start, and starting always requires overcoming resistance. Tashiro\* has shown that "a resting nerve gives off a definite quantity of carbon dioxide," that "stimulation increases CO<sub>2</sub> production" and that "CO<sub>2</sub> production from the resting nerve proportionately decreases as irritability diminishes. These facts prove directly that the nerve continuously undergoes chemical changes and that nervous irritability is directly connected with a chemical phenomenon." Since carbon dioxide is the result of oxidation, a series of these oxidation phenomena would cause an explosion wave. We may suppose the available energy to depend upon the number of these explosion waves per second. Reasoning then by analogy from the results of chemical action with which we are familiar, a certain number of explosion waves must appear per second to make voluntary attention possible, and the closer the concentration

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\* *The American Journal of Physiology*, Vol. 33, p. 95.

the greater the number within a given time. A high degree of efficiency in study and thought will be accompanied then by a correspondingly rapid succession of explosion waves. By analogy, again, we may venture to say that the delay required in similar cases, with which we are better acquainted, is also needed here to produce the requisite rapidity in successive explosions.

Efficiency, then, would seem to require that the number of these delays be as few as possible. Why **A suggestion for getting results** should not the daily program be varied when the interest of the class suggests the wisdom of the change? Results are wanted and the time to mold the mind and impress ideas is when the enthusiasm of the children is at white heat. Stopping the recitation at a vital point when the pupils are keen to follow the thought to the end is a common experience with all teachers; and the next day the alertness is gone and half of the period must be used in working up the interest again, only to leave it unsatisfied at another critical moment.

I am aware that continuing the work at times beyond the hour would disturb the regularity of **Utilization of enthusiasm** the classes but, again, I venture to say that we are after results. The irregularity would even up because the circumstances would not always require extending the period with the same class. Besides, this plan would stimulate the pupils to inquiry and reading outside



the school. A certain point in the development of a topic must be reached before the children are anxious to investigate a little for themselves, and dismissing classes by the clock ignores the growth of the subject under discussion and the enthusiasm aroused. Critical moments, when the mental temperature is high, are not the times to dismiss classes if efficiency is the aim. When, on the other hand, the interest has waned or the children begin to show signs of fatigue, class work is unprofitable. The pupils should then be given different work or progress is delayed and dislike for the study engendered. This plan would also help to conserve the feeling of good will to which we have referred, because it would tend to foster the feeling of pleasure which we have found invariably associated with effective work. Taking enthusiasms into account always promotes pleasure and good will.

But the influence of the emotions on the learning process does not end here. Ruger found\* two **Other hindrances to learning** forms of personal attitude—both emotional—inimical to success in a problem presented for solution. These are the attitude of feeling that one knows the answer and that of self-attention. Both of these emotional states, as Ruger's investigations show, prevent the attention from attacking the problem directly and without prejudice. Those who have not acquired the scientific habit of examining a problem before

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\* *The Psychology of Efficiency*, by Henry Alford Ruger, *Archives of Psychology*, No. 15, June, 1910, p. 1.

drawing conclusions, and of holding these conclusions tentatively even after examination has suggested them, have yet to learn the first principle of investigation. Freedom of mind is essential to productive study, it matters not how elementary the problem. Take, for example, the question, Why is St. Louis a large city? The children may have learned that a large navigable river tends to build up a large city. If, however, they attack the question on that supposition they will go far astray, because at present the Mississippi is a comparatively unimportant factor in the growth of St. Louis.

Ruger observed that those with whom he worked immediately made assumptions about the nature of the problem and that they held them more or less in mind during the work, to the serious detriment of their progress. These assumptions, often accidentally established in the mind, became thoroughly entrenched, Ruger says, without being subjected to criticism. His learners watched for a cue or the first glance suggested a particular way of stating the problem or of defining the plan of solution without any active search for other ways of looking at the matter or any criticism of the method accepted. "In general, the solutions were not the result of mere straightaway thinking and the consequent formulation of a thoroughgoing plan of action, but were the outcome of an extremely com-

plex interrelation of more or less random impulses and ideas."

Children are prone to jump at conclusions. They seize as the answer to the question the first idea that comes to them from their past work. The teacher's plan of education should demand examination of the problem before any conclusions are drawn and the children should be taught to think of possible solutions as questions for further examination in the light of the conditions and suggestions of the problem, rather than as answers immediately to be accepted. This is the method of elimination by which the possible solutions are gradually reduced in number as one after another is eliminated from consideration until, finally, only one or two remain. This is thinking. It requires more time at the beginning but in the end it saves time because the pupils learn self-reliance by gaining power to study out solutions for themselves. Besides, the recitation advances beyond the guessing game which children are prone to make it until they find that such answers will not be accepted. A class is what the teacher makes it. The children adapt themselves to the conditions with which he surrounds them and they will do just as loose or accurate thinking as these conditions demand. But the method must be used daily and relentlessly. This continued, se-

**Importance of  
encouraging  
discrimination**

vere insistence upon the scientific method of thought in simple as well as in complex problems is what Rousseau seems to have meant when he said: "May I venture to state here the greatest, the most important, the most useful rule in all education? It is not to gain time, but to lose it."

Some of the assumptions which interfered with the solution of his puzzle-problems Rucker has said

**The unconscious factor in the learning process** arose in the minds of the learners without their knowledge and became established before they were

subjected to criticism. This is an observation in a particular instance of what is probably a general fact in learning. Many of our methods of securing results in any field are unconsciously acquired even when we are under guidance, and if untutored practically all are gained in this way. Our study of the psychology of learning has shown agreement among investigators on the unconscious adoption of short-cuts and other devices for hastening results. Let us now examine the pedagogical significance of this.

First of all, it is clear that, if left to themselves, children are liable to acquire uneconomical habits

**The right moment to help the learner** of work. Again, there is grave danger of over-help. Indeed, many are convinced that to-day

children receive too much assistance. What then is the solution of our problem? When should help be given? The investigations in learning have

answered the question. Suggestions are most valuable at the moment when the learner has hit on a new way of meeting a difficulty. If he is not yet aware of it, i. e., if the new method is still in the unconscious stage, it may be pointed out and its advantages or disadvantages made clear. A learner is not interested in solving a difficulty before he meets it. Why should he be when he does not know that he will ever encounter it? This is human nature, especially child nature. We are not interested in what we are wholly ignorant of; and a difficulty of the future is of this sort. But if children care to gain some skill in what they are engaged on, the moment that they become conscious of an obstacle in their way they are alert to any successful plan of overcoming it. If help is given too soon, the child goes on his way only partially acquainted with the difficulty. Indeed, he may hardly know that it is in his way. He has not yet met it or tried to meet it, either successfully or unsuccessfully. If, on the other hand, he actually struggles with the situation, for at least a brief time, he has learned to know it. He then appreciates the better way suggested because he has tried his hand and only partially succeeded and he knows what the new method does and why it does it. His partial failure was really of advantage because he now learns to be critical of plans of work. The trial and error method, as used here, is valuable up to a certain point because partial success or com-

plete failure confronts the learner with the difficulty. But he should be shown the better way before he has acquired uneconomical habits of execution.

One need not look far for illustrations of what we have been saying. In learning to write, children unconsciously assume positions of body, arm and fingers which, to a certain degree, meet the needs of the situation. They do not consciously select these positions and they do not subject them to criticism before their defects are called to their attention. In this particular case it is probably of little importance whether they are started right or whether they are allowed to try their own varied ways of doing the work long enough to become conscious of their awkwardness before the disadvantage of these positions is pointed out. In arithmetic, however, the wisdom of a little delay in suggesting methods becomes apparent. Some of the children at the beginning will write everything down and use their fingers in adding. Others will do some of the simpler processes mentally, putting only the results on paper. The latter will, of course, finish long before the others. No one wishes to do unnecessary work, and besides, children are anxious to equal or excel their associates. After the slower ones have discovered that their methods do not get results is, therefore, the psychological moment to show them the better way. In foreign languages,

### Illustrations

again, the application of the principle is evident. Learners try to meet the same situation in different ways. Some thumb their vocabulary for each word in the order in which it comes. A few look up all of the words in a paragraph and write the meanings down, regardless of the sense. A day or two is enough to prepare these children to appreciate suggestions for a better plan of work. Those who take the words in succession find that the author of their book did not think in the English order and the others discover to their surprise that only one of the many English words fits the context or even that the vocabulary contains no equivalent for the thought. Now they see the problem and their desire to hasten the preparation of their lesson, if no higher motive operates, makes them receptive to suggestions. Then, when they are told that by reading a paragraph thoughtfully, half a dozen times in the original language, they will "feel" the meaning of certain words as well as their relation to one another, and that soon they will find it unnecessary to look up all the words in their vocabulary, they do not resist the suggestion because no one wishes to take unnecessary trouble.

Elemental habits must be mastered first of all. Declensions, conjugations, rules in grammar and tables in arithmetic must become automatic. But before this happens the observant teacher will see that habits of a higher order are making their

**Overlapping of  
higher and lower  
orders of habits**

appearance. Some of the children will "feel" the meaning and construction without certainty of the reasons. But there is always a tendency to drop back into more elemental ways of working. Children who have acquired a little facility in reading sentences in a foreign language without consulting the vocabulary are prone to reduce their work to translating words instead of thoughts. Care is needed here to keep the pupils up to the higher order of habits while continuing the drill for mastery of the lower. There is a kind of struggle for existence, for self-assertion, among habits and the economical ones should be helped to prevail. Elemental habits must finally be replaced by habits of a higher order or the child continues on a low level of efficiency. In English grammar the pupil must learn to "feel" the relation of parts of a thought to one another without picturing words and diagrams. For this reason the use of diagrams should not be too persistent or too long continued. In Latin and German, again, a "good form" of execution has not been attained until the pupil can translate simple sentences, after reading them in the original, without a dictionary.

There are interfering associations among ideas just as there are interfering movements in muscular activity but these are gradually eliminated as efficient associations become automatized. The elimination of associations unprofitable from the point of view of



present need is usually an unconscious process unless an instructor is at hand to suggest a better way. Teachers should always be watchful for short-cuts. The learner naturally adopts them and they should be encouraged. They represent the pupil's personal reaction to the problems. This is economy of method; and beyond this, the writer has already called attention to the fact that there is no one universally efficient way of approaching and solving a problem.\* Each child has his own point of view and his manner of approach expresses his thought just as our own represent ours. As long as a pupil is logical his method is as correct as any other and if he finds a shorter process so much the better. He should be praised for his clearer vision. Adults are too prone to force their methods on the young and in so doing they stifle originality and crush interest. The importance of taking into account individual differences in ways of thinking has also been emphasized by Meyerhardt.† Compelling children to adopt another method than their own before they have thoroughly mastered the latter starts interfering associations of which we were speaking.

Bolton‡ found, in his study of memory in school

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\* See *Mind in the Making*, Chap. III.

† *Economical Learning, Pedagogical Seminary*, Vol. 13, p. 145.

‡ *The Growth of Memory in School Children*, by T. L. Bolton, *American Journal of Psychology*, Vol. 4, p. 362.

children, that "ideas previously in the mind and  
**Cause of interfering associations** association forms of ideas are factors in causing the confusion of the memory image and its final loss." Bergstrom established the same fact in another way.\* He tested students in sorting cards, first according to one order and then according to another. The second sorting, in a different order, required more time than the first and a greater number of errors was made. Evidently the associations formed the first time interfered with the rapidity and accuracy of the second series. "It is a mechanical struggle of habits," is the way in which Bergstrom puts it. Interference of associations was also observed by the writer in his experiments, and by Book in typewriting.† The importance of this for teachers is obvious. Incorrect answers establish interfering associations. Sometimes, in the effort to show why an answer is wrong it is emphasized to such an extent that its associative recurrence is a practical certainty. Then memory surrounds it with such semblance of truthfulness that its validity to the child is assured. Incorrect English, false syntax intended for correction, also violate the principle that when children are getting their bearings in the various subjects of study, as in the ele-

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\* *Experiments Upon Physiological Memory by Means of the Interference of Associations. American Journal of Psychology*, Vol. 5, p. 356.

† *Loc. cit.*

mentary school, it is of the utmost importance that, as far as possible, only true statements be made. When wrong answers are given they should not be stressed.

In our study of progress in learning we found that beginners advance by sections. Certain habits of execution improve for a time more rapidly than others. Perhaps, indeed, some habits will not seem to make any progress at all toward automatization. The inclination of the teacher is to ignore temporarily the habits which are gaining and to spend all of the time in trying to bring the others up so that the pupil may present an even front. This is an uneconomical procedure. Following nature is an old phrase which has never had the same meaning for different advocates, but if this vague expression has any intelligible meaning it is that the momentary bent of the child should be utilized and pushed to the limit. Probably the correct method is to urge the forward habits to complete automatization but, at the same time, not wholly to neglect the others. The reason for the latter action is that otherwise the teacher does not know when another habit is beginning to grip the pupil and he must be ready to aid its growth the moment it appears. Besides, moderate drill in a habit not yet nascent is the incentive for its start. Without any stimulus it would have no reason for beginning. A child

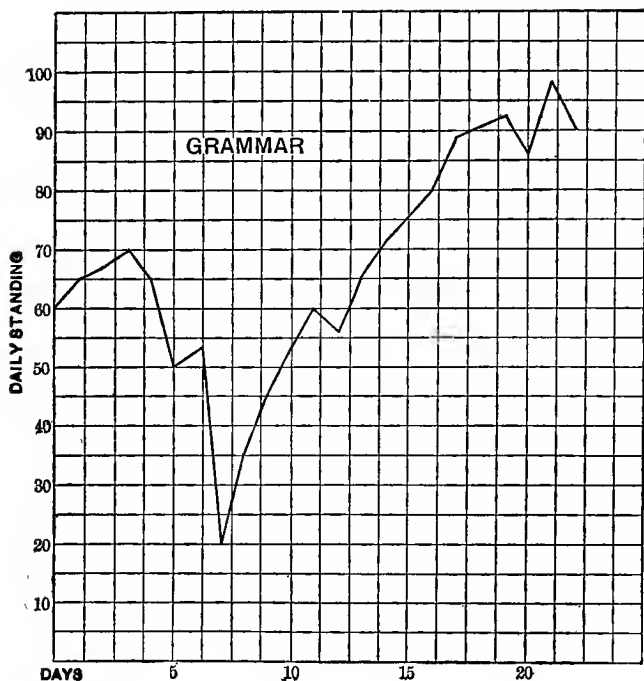
should not be expected, however, to present an even front as he advances. This same psychological principle of unevenness in development is seen in the so-called nascent periods for reading, drawing, debating, and the scientific interests of various kinds. They come at different times, and each, for the moment, fills the child's whole mind. Of course an interest does not always reveal itself in the same way in different children. Its particular form or, indeed, whether it shall appear at all, depends on the environment. Interests require stimuli to draw them out. Next to supplying these incentives, then, the important thing is to utilize nascent interests to the full for growth when they do appear. And it is the same with the habits of execution of which we were speaking. Stress to the utmost those that are in growth and, meanwhile, coax the others out with enticing stimuli. The subtle influence of the school environment here as elsewhere is the guiding, if not controlling, force.

Plateaus in the learning curve are but another instance of the unevenness of progress. The differ-

<p><b>The plateau as a protest against cramming</b></p>	<p>ence is that here all progress stops as far as the teacher can observe or marks indicate. As has been said, however, it is a case where marks do not show the facts. The rapid rise that follows plateaus makes it clear that the periods of apparent cessation of progress are very active moments.</p>
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The pupil has been gathering information and applying it as best he could, but now he is overloaded and the mind is in danger of being clogged. Plateaus are the mind's protest against being overloaded. Much of the pupil's information must be so thoroughly assimilated that its application becomes automatic, if the confusion is to be clarified. One need only think of the rules of English grammar with so many exceptions and variations that the rules almost cease to exist, and of the puzzling complexities of foreign constructions and idioms, to realize the exasperating disorder that fills the minds of young children.

In order to learn whether the curve representing the progress of school children differs essentially from that of older persons, the **Curve of learning for a pupil in English grammar** marks of a pupil beginning the English grammar work of the seventh grade were obtained. Care was taken that the marks should be as accurate as possible for the days indicated. The girl whose progress is shown was of "average" ability. She made her grade each year but did no more. For this reason she seemed to be the best representative of the usual run of school children. There were several better pupils in the class whose curve of progress did not go so low as did this girl's, and there were two who reached a lower level but did not rise. They are the ones who must repeat the work.



The curve shows that this pupil, beginning with a grade of sixty, advanced during the first three days to seventy and then dropped, with only one intervening rise, to a grade of twenty. At that time steady work began to show results and her marks improved, with occasional recessions, until her standing was ninety-eight. Her teacher says that the child now seems to be permanently somewhere between eighty-

five and one hundred. The curve differs in details, as those of individuals always do, but in its essential characteristics it is the same as the others we have shown. In this, as in the other curves, progress is discontinuous and there are days when no marked advance or recession is made. The eleventh and twelfth days and all after the seventeenth illustrate these plateau periods.

The time finally comes when the nervous currents, drawn one way and another by conflicting associated ideas and blocked by interferences set up by the unorganized mass of thoughts, refuse to run true. The **Confusion of ideas** conflicting ideas and confused thoughts include what the children have learned and have been told about the innumerable exceptions, variations and modifications of declensions, conjugations, rules, and idioms that come under no rule. All of them have their associations, some in agreement and some in apparent disagreement with one another. And this tangle of disagreement must be straightened out and everything brought into order. The long drop of the curve of progress of the grammar-school girl, given before, represents just such a condition of mental confusion. Work and time, the latter no less than the former, are needed to bring order out of the chaotic accumulation of facts.

Clearly this is no time for tests or examinations. Marks have no grading-value. Their use just now

**The use of tests at this time** is to guide the teacher in her selection of topics for drill and for further explanation, and to show the progress of the automatization of forms and rules and principles. Tests may be given but they should be regarded as merely written exercises and after the papers have been corrected and returned the marks should be discarded. The reason for returning the papers to the class is that competition with one's own record and with one's fellows is an incentive for better work. Several writers, as we have seen, have observed this in their investigations.

Plateaus in the learning process, of which we have been speaking, are like the block signals on a railroad. They give warning of the danger of going ahead. **Plateaus a signal for special drill** Now is the time for renewed drill on everything that relates to the work. In arithmetic, the teacher should return to the place at which the clear accurate knowledge of the children ends and make that the starting-point for vigorous and intelligent drill. In English grammar, the rules should be reviewed, exceptions and modifications made clear, but always with endless drill, and with innumerable examples, each pointed at a principle. And, again, in Latin, declensions, conjugations, rules with illustrative examples, and idiomatic sentences committed to memory, all must be revived with ceaseless drill.

Naturally, with such continuous, relentless drill there is grave danger of monotony, and monotony,



**Effect of monotony on plateaus** has been found a potent influence in prolonging plateaus. But as long as delay in progress is caused chiefly by disorder in the mind, the treatment is clearly indicated. The disorderly ideas must be brought into subordination. Economic habits of execution which constitute "good form" must be perfected. Declensions, conjugations, rules and principles in mathematics, languages and sciences must be so completely assimilated that their appearance at the right moment is as automatic as the boy's jump at sight of an object falling toward him through the air. This leaves the attention free for larger questions, for the higher order of habits to which reference was made in the chapter on progress in learning.

The situation is wholly altered if monotony obtains a hold. The delay in progress may then be abnormally prolonged. The teacher **Suggestions to offset monotony** should prevent this at all hazard. It is the opportunity to use her ingenuity. While there should be no advance, the work should be entirely new. Fresh problems in arithmetic should be gathered from many books and, after being solved, they may be compared with others with which the children are familiar to "set" the principle; and so with English grammar. In German and Latin new stories should be read but always with the drill upon the facts and principles concerning which the pupils are confused. This variety of material, besides driving away monotony,

makes the children flexible in thought. They see the same principle applied in cases that are alike, yet different, and so they learn to compare and judge and think, instead of forming mechanical habits of thought which permit no variation. This mental flexibility is what I understand Rousseau to have meant when he said in his paradoxical way, "The only habit a child should be allowed to form is to contract no habits whatever."

Finally, time is needed in the learning process. This is but another point of view of the subconscious utilization of experience and of plateaus. Learning is a gradual growth toward economy of effort in accomplishing that upon which one is engaged. Let us see how this growth proceeds, Every task, whether mental or manual, is a complex of lesser achievements which contribute to the whole. And it is these contributory factors—the problems or situations which must be met at each moment in the progress of the work—that serve as stimuli for appropriate muscular movements or thoughts, according as manual dexterity or mental skill is required. At first the learner inadequately meets the situation. As we have seen, the method is that of trial and error. By degrees the useless and less effective reactions are eliminated and some measure of success is achieved. Many of the better methods are acquired unconsciously, as we have found, and are well along in use before the learner

**Time a factor  
in growth of  
experience**

notes them. Now all this growth in economy of effort requires time because the associative recurrence of a definite order of nervous discharges must be established. Hastening progress by showing the learner how to do the work ignores the laws of growth and reduces him to the stage of imitation. It stifles the desire to initiate action which is the beginning of originality. Learning by imitation subverts learning by doing. Suggestions too long deferred, on the other hand, give time for bad habits of execution to become fixed. The successful teacher watches for the moment when the pupil, conscious that his method is not securing the best results, looks for help. Ability to know the economic moment distinguishes superior teaching.

## CHAPTER VI

### HABIT IN LEARNING AND ACHIEVEMENT

**I**T was Walter Pater, I think, who said that forming habits is failure in life; "for, after all," he continued, "habit is relative to a stereotyped world, and meantime it is only the roughness of the eye that makes any two persons, things, or situations, seem alike."

Habits of thought start in our environment. Men are born into certain classifications of ideas. They **Our inherited** are orthodox or unorthodox, con-  
**view-point** servative or radical from birth. Of course, I do not mean that these ideas are innate, though they might almost as well be, for the very atmosphere which the child breathes is surcharged with them. Naturally, these points of view become the customary ones and the ideas within the field of the observer's vision come to have definite, fixed relations to one another. It is as if a series of mountain peaks were always seen from a river seat, with no alteration in the relative positions which they hold. Take those who have had only this view out into a meadow with all the peaks in sight and they can not discover an intelligible arrangement in the

panorama. They do not even recognize the mountains so often seen from the river seat because the new view-point alters the relative arrangement in the picture.

Ideas which have been classified and tied up in bundles properly labeled give one a comfortable feeling of mental security. All that is **Futility of classification** necessary then in judging an act is to test it by the classification; and when once it can be brought under one of the categories of the system the whole matter seems quite clear. This method is convenient and easy. Its only fault is that it does not lead one anywhere. A conspicuous illustration of its failure was the comment on General Nogi's suicide. Obviously, knowledge of the religion and the philosophy of Bushido was needed to understand the act. Anglo-Saxon classification of ideas is inadequate for its interpretation.

Ideas are like planets in being deflected from a straight course by all others within their range of **Inadequacy of settled ideas** influence. The difference is that with ideas the amount of deflection is not easy to calculate. The significance of thoughts can not be determined with mathematical accuracy and it is just this difficulty that makes a mobile state of mind unpleasant. Constant rearrangement of opinions and beliefs to meet the requirements of new facts would keep one thinking, and thinking is an effort. At any rate, one likes to feel at times that certain questions are answered.

To finish one thing after another and pack them away seems to measure progress. "He settles questions and you can put it down in your note-book," said a college student not long ago in praise of an instructor. When one wishes to use these "settled" opinions one pulls out a package of ideas as incongruous at the moment as were those of Rip Van Winkle when he awoke. It is like tying up a bundle of clothes for future use only to find later when they are undone that everything is out of date.

A great deal has been written about the importance of conserving ideas. Conservatism is society's safeguard, we are told. Were it not for habit the classes would be in endless strife, but men grow accustomed to their lot and find things quite enduring. All this, of course, is true. Conservatism, however, which is only another name for certain kinds of habits, is so firmly "set" in man as to require no effort to keep it going. The difficulty is to break away from habits of thought and action, and it is time to spread the gospel of variation to encourage independent thinking.

"The peculiarity of arrested civilization," says Walter Bagehot, "is to kill out varieties at birth, that is, in early childhood, and before they can develop." Altering even one belief requires a reorganization of many ideas because of their dependence, one upon another. This would disturb the system of thoughts which has been brought, largely unconsciously, it is

true, into such pleasant harmony. For this reason it is so hard for man to change his party—he rarely does unless convinced that his system of ideas will be less disturbed by changing than by remaining—or for anti-vivisectionists to believe that it is better for surgeons to experiment on animals than on man. “Hardly any of us,” said William James, “can make new heads (for ideas) easily when fresh experiences come. Most of us grow more and more enslaved to the stock conceptions with which we have once become familiar, and less and less capable of assimilating impressions in any but the old ways. Old-fogyism, in short, is the inevitable terminus to which life sweeps us on.”\*

The persistence of the argument for conservatism is due to the desire for self-justification of those who do not wish to change; and **Conservatism illustrated by history** there is just enough truth in what is said to make the argument sound plausible. As long as discussion deals with the outcome of conditions not yet realized, the conservatives have the advantage in the argument because no one can demonstrate what the future will bring forth. But when we look back over history we have a clear view of what it means. The pathway of progress has been blocked by the neglect of men who made the sciences upon which our comfort, health and lives depend, and their crime consisted in resisting the conservatism of their day. Before Harvey published his

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\* James' *Psychology*, p. 328.

book on the *Motion and Uses of the Heart and Arteries*, in which he demonstrated the circulation of the blood, he enjoyed a large practice, for he was a skilful surgeon of reputation. But after the appearance of the book "he fell mightily in his practice; 'twas believed by the vulgar that he was crackbrained and all the physicians were against him." Harvey himself says regarding the reception of his discovery, "These views as usual pleased some more, some less; some chid and calumniated me, and laid it to me as a crime that I had dared to depart from the precepts and opinions of all anatomists. I tremble lest I have mankind at large for my enemies, so much doth wont and custom become a second nature."\*

Conservatism, however, is suited to a fixed rather than a changing condition of society. It suggests

**Difference between nervous system of man and lower animals**

no plan for meeting the new conditions that arise. One of the purposes in the education of children, perhaps the chief purpose, is to train them to act appropriately—to fit their reactions to events and situations. The aim of the education of young animals is the same, but their limitations are much narrower. Primarily, the nervous system consists of paths joining sense organs with muscles. The connection between sensory and motor nerves is made through

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\* See *The Man Who Discovered the Circulation of the Blood*, by Dr. D. F. Harris. *Popular Science Monthly*, Vol. 82, p. 459.



switching stations, and the adaptability of reactions to events in the external world depends upon what transpires in the nervous centers between the arrival of the incoming impulse at these switching stations and the departure of the outgoing current that produces the reaction. In the lower animals little is likely to intervene because their reactions are largely determined at birth by the organization of their nervous system. A dog never refrains from eating what is put before him because it caused indigestion a few days earlier. Indeed, it is doubtful whether he even recalls a single occurrence of that sort when once the discomfort has passed. To be sure, animals learn to avoid what causes pain but the new reaction must be forced into the nervous system by repeated experiences.

We see here the differences between man's reactions and those of the lower animals. Man's nervous system permits a longer delay between the arrival of the incoming impulse and the departure of the outgoing and with this delay comes an increase in the number of possible reactions. Many motor paths connect with the switching station and the intervening time gives opportunity for inhibitory and reenforcing currents to become effective. Ideas recalling the unfortunate outcome of a former act may be associated with one movement and so inhibit it. Or, again, thoughts of the value of time for deliberation, the better to judge the situation, may prevent immediate action.

To the lower animals superficially similar situations are accepted as identical in all respects. Fishes do not examine a worm before snapping it to ascertain whether it is impaled on a hook. With some fishes and in animals above them there is sometimes delay, but in all such cases the caution, if it is not instinctive, has resulted from repeated discomfort. Now the extent to which man repeats the same reaction to situations that appear superficially identical measures his approach to the condition of the lower animals. The same mischievous act of children, for example, with its great variety of possible causes, as stern or even cruel treatment at home, time to waste after learning the lesson, desire for fun, revenge, etc., may always bring the same punishment. In this sort of action little or nothing occurs in the teacher's mind between the arrival of the incoming and the departure of the outgoing impulse. The incoming nerve current on its arrival at the switching station immediately runs out to a muscle through the nerve path which it has always taken. This is habit. The difference between man's habits and those of the lower animals is that the latter, except as they have been changed by rigorous training, are the habits of the species, while man's are acquired individually.

Human evolution, whatever else it may be, is evidently growth away from fixed reactions; it is

**An illustration**

learning to alter responses to fit the niceties of situations to which the individual is reacting. But this requires greater delicacy in interpreting situations. Conditions which the unintelligent would group together in their classification, with one reaction for each and all, are now distinguished from one another because their differences are recognized. An illustrative incident was recently reported to the writer. A boy came to school "armed to the teeth" with wooden knives and pistols. The teacher waited to see what would happen and soon found out. A girl in front of him was shot and those who passed his seat were stabbed. Of course there was a good deal of excitement, a part of which was natural and another part added by the children to show their appreciation. Now the conventional reaction was punishment, but the teacher had learned the wisdom of distinguishing between situations. She had escaped from pedagogical habits. So she asked the boy why he did it. The answer was immediate and frank. He had been reading about cowboys and wanted to become one.

"But do you know," continued the teacher, "that real cowboys would have nothing to do with you except to drive you away from their ranches?"

This amazed the boy and he asked why.

"Because you are not courteous to girls," replied the teacher.

This unexpected bit of information gave a new point of view and the aspiring hero dropped several points in the estimation of his fellows. The teacher then spent two or three minutes in telling the children something about the good qualities of cowboys. After that the subject and the knives were laid aside until close of school. When, at dismissal, the boy passed her desk the teacher asked him whether he would like to read about cowboys. He was eager for the books and so, on the following day, she brought him several of the better sort. This marked the beginning of his interest in reading and in his teacher.

Skill in the interpretation of situations is largely a matter of experience; but experience is not gained by merely living through a series of events. The question is, what meaning has been found in them?

**Experience as  
interpretation  
of events**

Things occur in apparent isolation or in a setting of other things and happenings, some of which are important for their meaning and others are without significance. Interpretation consists in finding the relation of these things or occurrences to larger, more comprehensive groups of events or ideas. When fossils were first discovered they were just so many strange objects to be wondered at or accounted for. They were explained in several ways, as patterns of animals which God had made and then, dissatisfied, had thrown away. But Darwin's

principle of descent with variation brought them under a general law. It revealed their meaning. Gaining experience implies, among other things, breaking habits of thought, getting away from traditional or environmental classifications of ideas. As long, however, as the nerve current runs out through habitual paths the customary associations arise, and new relations—the basis of meaning—are not discovered. The explanation of fossils as God's unused models of animals followed the conventional classification of causes of things and events. If, as we have seen, getting experience involves finding new meaning in objects or situations, then following habits of thought and action fails to give experience because repetition affords no opportunity for a critical estimate of the comparative worth of responses. Change is indispensable to critical, productive thinking.

The lower animals are prevented from discovering meaning by the limitations of their nervous system. The less intelligent an animal the more fixed must be its habits of response. This is necessary for survival. The habits—instincts—of animals low in the scale are so nearly uniform that for many years they were thought to be invariable. Those of higher animals have long been known to be variable and it is because of this variability in habits that the question of the intelligence and rea-

**Intelligence means  
variability in  
habits**

soning of animals has arisen. In other words, intelligence and variability in habits progress together. When we try to judge intelligence we at once ask how well adapted are actions to novel situations and how much meaning seems to be found in the events? But this inquiry involves the further question, to what extent does the animal group objects or events under one or a few classifications? For, obviously, if many dissimilar objects or events are grouped together little or no meaning can be found in them, since meaning begets contrasts and differences, from which—but only after differences have been seen—similarities appear, followed, again, by a deeper and more comprehensive meaning. The final question, then, in estimating intelligence, and one which includes all the others, is, to what extent does the animal profit from experience? Clearly, there is little profit if dissimilar objects or events are classed together with the same reaction for each. Fishes, for example, have a very limited range of classification. If the day is right they snap at almost anything that is thrown into the water.

Let us see the effect on human actions of a limited classification of causes and effects. Obviously, the result of shaping conduct by conventional rules—which are only environmental habits operating on individuals—can best be understood by observing their cumulative effect on adults.

When one reads about the childhood of eminent men and women one is amazed at the number who

Notable failures  
of conventional  
judgment

were thought stupid by their teachers. An investigation of this subject by the writer easily revealed more than fifty such cases.\* A study of the way in which these children passed their time showed, in many instances, that they were not idle but were absorbed in things of which the school took no account. Newton's idleness, for example, was caused by thoughts about mechanical inventions. During his play hours he was constantly engaged in constructing models of machines. He made, among other things, a water-clock, a windmill and a carriage to be moved by the occupant. Yet this busy thinking child was rated lazy by the conventional classification.

John Ruskin, who was engaged in original composition from seven years of age and who at ten presented his father with an original play of no little merit, at sixteen was characterized by his teachers as "shaky" in scholarship and a little later entered Oxford as a "gentleman-commoner" because it was thought doubtful whether he could pass the examinations.†

Doctor Ehrlich, in the laboratory of his teacher, was pointed out to visitors, with a smile, as of not much good but a clever tissue stainer. Yet, at this very time he was showing the ability and dogged perseverance that later kept him at the same in-

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\* See the writer's *Mind in the Making*, Chap. I.

† See *John Ruskin*, by Frederic Harrison, p. 16.

vestigation until he had made six hundred and five combinations, all "failures" according to the usual acceptance of the word, but all really successes, since in each experiment he saw new meaning and, finally, at the six hundred and sixth attempt, succeeded.

It would be a rash conclusion to say that these children were not appreciated because of lack of ability in the teachers themselves.

**Their explanation** The cases are too numerous for that explanation. Besides, some of the teachers are known to have been exceptionally able men. The reason for their failure to understand these pupils and appreciate their ability is that they had adopted the conventional pedagogical habits. They judged their pupils by the inadequate standard classification. Another reason for accepting this explanation is that some of the fifty "stupid" children, who became men of eminence, had occasional teachers who appreciated their ability, and, as far as the writer has been able to learn, all of these teachers were men who had freed themselves from the conventional habits of the schoolroom. They were like Joseph A. Allen, of whom Andrew D. White says, he was "the best teacher of English branches I have ever known. He had no rules and no system; or rather, his rule was to have no rules, and his system was to have no system. . . . He seemed to divine the character and enter



into the purpose of every boy. Work under him was a pleasure."\*

Business men sometimes seem to think that teachers have a monopoly on sterilizing habits but if they would read the addresses delivered at the Tuck School Conference on Scientific Management, this belief would quickly vanish. One† of the speakers told of finding the proprietor of a large printing house personally answering all telephone calls. When remonstrated with for wasting his time in office boy's work, he admitted his inability to let subordinates attend to details for which they were quite competent.

Another speaker‡ quoted a conversation with the proprietor of a large establishment: "I am constantly doing things which I have no business to do, but I can't seem to get away from them," was the way in which this man confessed his slavery to a pernicious habit.

The difficulty of throwing off conventional ideas in the business world was shown by the assertion of one¶ of the speakers that the National Cost Congress is advocating the use of an antiquated cost system.

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\* *Autobiography of Andrew D. White*, pp. 8-9.

† M. L. Cooke. *Report of the Conference*, p. 245.

‡ Edwin S. Brown. *Report of the Conference*, p. 245.

¶ M. L. Cooke. *Report of the Conference*, p. 242.

We have been discussing a phase of human psychology, the tendency to settle into fixed habits of thought or of action. It is one manifestation of the physiological law of parsimony. Certain conditions of life must be met and the organism makes the necessary adaptations in the most economical way. Modes of behavior which resist adjustment are gradually eliminated and new ways of acting adopted until the adaptation meets, at any rate, the minimum requirement of effectiveness. The process is commonly gone through unconsciously. We see here the difference between the usual reaction to conditions and that of reformers. The latter resist adaptation. But this costs energy and we have seen that man is physiologically inclined to be economical in this expenditure. For this reason reforms come in waves. Continued resistance to adaptation is impossible except with rare individuals. The conventional reaction is easier and the conventional is always conservative—it repeats past modes of reaction with just enough modification to satisfy the minimum requirements of changed conditions. This is the explanation of the antiquated cost systems urged by the National Cost Congress, the reason why business men are so often unable to break the habits acquired as subordinates and the cause of the continual use of conventional systems of classification and of traditional methods in the schools.

Acquiring a habit is easy. It usually gets us while we drift. Breaking one, on the other hand, is exceedingly difficult because nerve currents persist in running through the old paths which are more easily traversed on account of constant use. "The great difficulty which history records," says Walter Bagehot,\* "is not that of the first step, but that of the second step. What is most evident is not the difficulty of getting a fixed law, but of getting out of a fixed law; not of cementing a cake of custom, but of breaking the cake of custom; not of making the first preservative habit, but of breaking through it and reaching something better."

Bagehot has also pointed out the part unconsciously played in history by conventional ideas. **Walter Bagehot on conservatism** In the formation of national character, "at first a sort of chance predominance made a model, and then invincible attraction, the necessity which rules all but the strongest men to imitate what is before their eyes, and to be what they are expected to be, molded men by that model."† But adopting fixed habits of thought and action, and adaptation by imitation are methods suited to a static condition of society. They offer no program for change. "Our habitual instructors, our ordinary conversation, our inevitable and ineradicable prejudices," continues Bage-

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\* *Physics and Politics*, p. 52.

† *Ibid.*, p. 36.

hot, "tend to make us think that 'Progress' is the normal fact in human society, the fact which we should expect to see, the fact which we should be surprised if we did not see. But history refutes this."\*

William James† has called attention to the release of energy which sometimes follows a complete break with habits. The release of mental forces sudden burst of energy and rise of ability that accompany new plans and a change of occupations has often been observed. Men unexpectedly become adequate to the responsibilities of much more important and difficult positions than they have previously held. "I did not know it was in him," is a common remark. It was in him but could not be drawn on as long as he held his old position with its associated habits, to which he had grown so accustomed that the work ran along with the regularity with which one foot is placed before the other in walking, and with scarcely more attention. Habits of occupation reduce ability to the lowest level that the work will stand. Man does no more thinking than is necessary and habit eliminates the need of thought. This is true even in acts commonly felt to involve volition.

In speaking of the growth toward automatism in choice-processes revealed in his investigations,

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\* *Ibid.*, p. 41.

† *Science*, new series, Vol. 25, p. 321.

**Warning against automatic habits** Barrett says\* "regularity was manifested in every phase of the choice-process, in the manner of reading the card (to which the subjects reacted), in the manner of reacting, and of realizing the choice. Automatism entered into every detail of the experiment. Even the experimenter came to perform the various functions in a perfectly automatic way, so much so, that the salient note of the whole experiment toward the end of the series was its mechanical regularity." "We see," also, "that the natural tendency is toward automatic choosing. The times grow shorter, the number of phenomena (admitted within the field of choice by the subject) grows less, only one alternative is considered; there is economy in every sense, and finally, the motivation reaches such a point that it never, or practically never, deviates from a certain curve or motivation-track." In Barrett's earlier experiments those who were being tested made many remarks about motives, feelings and judgments which influenced action, but toward the end they had little to say. "There was nothing to remark. There were no feelings, hesitations or motives to describe. The mental act had become direct and simple. . . . The will had gradually ceased to expend useless effort. Volitional force was economized. . . . Automatism held sway, and there was nothing to

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\* *Motive-Force and Motivation-Tracks*, by E. Boyd Barrett.

record." That is a pretty good description of death as far as mental activity is concerned; yet it seems to be the final outcome of being possessed by habits. Evidently, if one is to have living thoughts, if, indeed, one is to think at all, it is necessary to resist the encroachment of occupation-habits by vigorous, determined change in methods of work.

A new position sometimes forces change because the old habits do not fit the new occupation, but with teachers even a new school **How teachers may prevent fixed habits of thought** does not always require a mental realignment. Clearly, then, a definite policy must be followed if teachers would avoid the mental sclerosis that always accompanies a "setting" of thought and action. As to the methods, that has already been indicated. If teachers follow the thoughts and feelings and purposes of their pupils, and build their method upon these thoughts and feelings, fossilization may be indefinitely postponed because the children will furnish enough variety to make things both interesting and fertile.

It is becoming possessed by a method and system to which all children are trimmed that arrests growth in pupils and teachers alike. Most of us are like Montaigne, "besotted unto liberty" and we resent being tailored to order. If the school is made into a workshop instead of a task shop, the teacher working with his pupils instead of over

them, suggesting and guiding rather than commanding and forbidding, proposing problems and revealing just enough of their wonders to awaken curiosity, he will be driven to the library to find answers to questions and his own study there will keep his mind fresh and alert. The resistless force of suggestion has never been appreciated by those engaged in training children. Doctor Adams, the first teacher who understood Walter Scott and almost the only one of whom Scott speaks with affection, was accustomed to invite his pupils to attempt poetical versions of passages from Horace and Vergil, but never made them tasks; and Scott, called "stupid" by his other teachers, was made to feel by Doctor Adams that he had "a character for learning to maintain."

There is, however, another class of habits which may be designated habits of behavior. These habits are the slyest imps of conduct with which man has to deal. **Habits of behavior** They are always taking an unfair advantage, running their own course while we are off our guard. When Benjamin Franklin conceived "the bold and arduous project of arriving at moral perfection" he found that while he was guarding against one fault, he was often surprised by another. "Habit took advantage of attention; inclination was sometimes too strong for reason."\*

If Franklin, with his naive striving for perfection,

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\* *Autobiography*.

found himself outwitted by his habits, how can we expect children to succeed?

**Program suggested by Boy Scout movement**      The children are in school only a small part of the day and unless we can bring to our support some force which shall continue to exert its influence beyond school hours, the undertaking seems hopeless. It is often wise, when perplexed, to look beyond our own work and see whether we can discover any social phenomena which will aid us in analyzing and interpreting our problems. Now we find just this assistance in the Boy Scouts. The writer happened, recently, to be on a crowded street-car with two Boy Scouts in front of him, one seated and the other standing. A gray-haired but vigorous man entered and pushed his way up to the seat of the Scout. Both boys saw him, but for a minute nothing happened. Then the Scout who was standing took his companion by the collar and pulled him out of his seat, at the same time touching his hat to the stranger and asking him to sit down. After the man had thanked them and seated himself the boy who had taken the active part whispered to his comrade, "Don't you know that Scouts must be polite?"

Why does the influence of the Boy Scouts' organization extend beyond the eye of the Scout Master?

**Explanation of its influence**      There is only one explanation. The scouting idea appeals to the racial instincts of boys and the enthusiasm which



it creates is carried over to behavior in other situations. Conduct then becomes an integral part of their thoughts about scouting. The emotions of the boys become allies in establishing habits of behavior. But it goes farther than this.

In a school with which the writer is acquainted, a boy began to improve in his studies and conduct **A power worth utilizing** with a rapidity that attracted his teacher's attention. When she asked him one day what had caused the change, he replied: "I've joined the Boy Scouts and my company won't let boys stay in it if they don't keep up with their classes." Evidently there is a tremendous power here waiting to be utilized in training boys.

It has been found, however, that the scouting idea is not the only one which draws power from **Use of pupil-government** the racial instincts of children. Experiments in pupil-government show that the instinct to do things, to manage their own affairs—in short the instinct for workmanship—is quite as strong as that for scouting. Indeed, the indications are that a large part of the power which is utilized by the Scout Masters comes from just this instinct to manage things. Joined with this, of course, is the instinct to show off, to exercise authority and, strangely paradoxical as it may seem, the instinct to obey. Children do not object to obeying when they are organized for obedience.

Pupil-government is often misunderstood. The teacher does not surrender his authority and turn

**A misconception  
about pupil-  
government**

the school over to the children. He acts through the children by suggestion, conferring with the leaders or letting them work out their difficulties themselves, as his judgment may dictate; and acting through the children is much easier when there is some organization. That pupil-government may be understood it may be said to be in every way analogous to an exhibition in which pupils and teacher join. The children feel that this exhibition is theirs, as indeed it is, and they organize for its success. The fact that the teacher does not assert himself and give directions does not mean that he is an unimportant factor in the preparations. If he is wise he remains in the background, letting the children plan and work, helping them, of course, by suggestions to the leaders at the right moment, but always working as one of them and emphasizing their ability, rather than his own, to meet the difficulties. And every teacher knows that his influence, though unaggressive, is not less potent here than in the schoolroom.

Children like to work the machinery of an organization. Besides, the admonitions then have the sentiment of the school behind them. Disturbances, which are usually popular and convert the trouble-maker into a hero, because the mischief is directed against the teacher, are now felt to be an infringement on the rights of the pupils, an annoyance to the body-politic of the school.

**Fascination of  
organizing**

There are various forms which pupil-government may take. The "Roman State," the "Athenian Assembly" and other experimental organizations referred to in an earlier chapter did not have the name of pupil-government and the idea seems not to have been emphasized in any of them. They all, however, represent organizations of the pupils to accomplish the things for which they were attending school. These activities appealed to the racial instincts to join together for a definite purpose, to manage things, and they brought to the support of the teachers that tremendously powerful racial force which demands employment and which will find it in escapades and trouble if it is not given other outlets. When these instincts are utilized and the teacher acts with them instead of against them, the influence for behavior that makes for success in the school and the larger world outside extends beyond the building because the work that the pupils are doing is then their own. They are doing it for themselves and not for the teacher, and the habits which are urged take on a personal interest. The children then move under their own steam and the power comes from the inexhaustible store of racial energy; and the teacher assumes his proper function at the wheel instead of pushing from behind. "The school is, in fact, given to the care of the pupils," says Demolins of the famous *L'école des Roches*. "It is their task; they are re-

Reasons for success of various forms of pupil-government

sponsible for its order and its cleanliness. The confidence and respect shown them develops self-respect and self-confidence. I do not know that there is any more efficient means to build up men.”\*

We have been trying to show the importance of the environment in the school for acquiring efficient habits. It is commonly thought that firm discipline and good teaching are all that is required to make a good school; but after all, these requisites are only prerequisites. The teacher may do his part admirably and yet the result be nullified by the atmosphere of resistance pervading the school; and just now we are inquiring how this resistance may be overcome. As in other matters which we have discussed, this problem of habit-formation, when reduced to its lowest terms, means making situations to which the children will adapt themselves; and the conditions should be so planned that in making the adaptation the desirable habits will become “set.” This, as we have seen, involves creating a school sentiment favorable to the employment of these habits.

A teacher’s task is much the same as that of a military general. If he has not a hostile army in front of him he, at any rate, has a body of children in more or less resistance to the things they ought to do. Now a good general plans the

**Similarity between  
task of a teacher  
and of a general**

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\* *Elementary School Teacher*, Vol. 6, p. 227.

conditions of the battle. Nothing in the configuration of the ground and no obstructions to the movement of troops are overlooked. He tries to plan a situation, by means of the contour of the field and through obstacles to the movement of the opposing forces, that shall compel the enemy to do the things he wants them to do. In other words he forces adaptation to the situation which he has planned; and he does it against the will of his opponents by utilizing conditions at his disposal and by creating others. Skill in this makes up his generalship.

The "setting" of the situation is as essential to success in school as on the field of battle. At best there are conditions, such as those of the home, which can not be fully controlled; and this makes those at the disposal of the teacher the more important. As long as there is no feeling of approval among the pupils for the formation of desirable habits it will be difficult, if not impossible, to make them take a firm hold on the children. If, however, there is a feeling that those who do not adapt themselves are obstructing progress and interfering with the rights of their fellows, adaptation is certain to be forced; and that feeling prevails very strongly when the pupils are organized among themselves to do the work of the school. Teachers must certainly insist rigorously on the method of work that leads to the formation of desirable

**Importance of  
right school  
atmosphere**

habits. We are speaking, however, of the way in which this insistence shall be made and of the manner of winning the pupils' support. Teachers may point out the value of certain habits and may inflict penalties upon those who fail to respond, only to be discouraged by the results at the end of the year. When, however, influence is applied through the organized body of pupils the result of the combined action is often amazing.

In the reaction against severity of discipline a certain laxness has arisen. The effort to make studies pleasant has ended in making them easy. There has been too much sentimentality and too little frank interaction between teacher and pupils as coworkers for the same purpose, with firm and ceaseless insistence on exactness in the habits which are essential to success. The scrub-woman of a friend of the writer, in a city famous for its schools, recently put it in this way to her mistress: "Annie, my girl, goes to school and she does a little of this and a little of that, and when the children are tired or don't want to do the lesson they're on, the teacher she changes them off to something easier, and you know that's no way to train girls. All their lives they'll have to do things when they're tired and don't want to. Now, when I tell Annie to do anything she says, 'Oh, I'm tired.' They don't teach 'em thorough, either. Last night Annie was doin' the dishes an' her father he seen that she wasn't

half cleanin' 'em and he made her 'do 'em over, and she says to him, 'You're awful hard on me, a sight harder'n teacher. She says I work real good'; and that's just it, Miss —, with the teachers. Pretty well's good enough."

The view regarding habits of behavior toward work which this scrub-woman expressed so crudely **The basis of good school habits** is good psychology. As we have seen, man expends just energy enough to satisfy the demands of the situation in which he is placed. If he can find ways of employing less energy by evading certain demands he is likely to accommodate himself to this lower level of requirement unless he has been trained to habits of application in his youth. With adults, social and business exigencies exert an influence entirely unknown to children. Obviously, the effort should be made to reproduce these efficient motives for behavior in the school. This reproduction of business incentives is one of the benefits of combining school work with work in shops and trades, under the regular conditions of these occupations; and the organization of children into pupil-government has the same effect, because the school then becomes a community with certain purposes and aims which the children have banded together to promote.

Such organizations also furnish reasons which the children can appreciate for the insistence of the teacher upon industry and accuracy and other

habits of behavior in the school. These requirements no longer seem to be arbitrary demands of the teacher. They have their justification in the work which the children are organized to do, and which they wish to do successfully because it is their own. The failure of any one to do his share meets the same disapproval from associates that is accorded "soldiering" on the football field. A child who has passed the age of ten or twelve does what he thinks his fellows will applaud; and when the school is organized into an industrial and social community with pupils for its officers, the motives of the larger society outside the school prevail. The children then applaud achievements, and in doing things successfully the habits which are essential to success in work are fixed. All of this is only the application of the psychology of behavior to the school.



## CHAPTER VII

### NEW DEMANDS ON THE SCHOOLS

**T**HAT was an epoch-making book that Herbert Spencer wrote on education. It fell like a thunder-bolt out of a clear sky, and, like the storm, it cleared the atmosphere. Some books are perennial because they touch human chords and set them vibrating with music that quickens a responsive mood in each. The strains they play are not the same with different persons because the responsiveness of the nervous system varies with experience. Such a book is Rousseau's *Émile*. I rarely find two persons who get the same meaning from it; but all—except those obsessed by the spirit of exactness—get something.

Spencer's *Education*, on the other hand, did its work and passed. It appeared when the authority of the ancients rested heavily upon the schools, and it released them from the weight of tradition by revealing a new body of knowledge and new problems—modern problems—which we had with us all the time but had not discovered.

The change was made slowly. Indeed, it is not

yet fully completed, for man rarely, if ever, breaks suddenly and completely from his **Timorous thinking** traditional moorings. Fear of the uncertainty beyond drives him back to familiar waters where he feels acquainted with the soundings. Unless, like Spencer, he be a pioneer in thinking, and they are few, he charts the sea of new ideas by paddling round the edges, going out a little way at times but hastily returning when things become too strange. Who has not had the experience of convincing a friend of a new belief only to find him back in his old ideas the next day?

So, in spite of the revolution that Spencer started there continues to be a great deal of uncertainty about the purpose of education. **The utilitarian and the philosophic ideals of education** Writers on this subject fall into two general groups. For the first, ability to make a living is what teachers should keep in mind, while the others emphasize what may be called the philosophical attitude toward life. Our thoughts and aspirations, all that we include under ideals, these philosophical educators insist are the important things to seek. The former took up Spencer's work where he stopped, and to-day they are the advocates of industrial and vocational training. They have secured a strategic advantage in having a definite program to offer. The other group is not so well organized because there is less agreement among its members regarding the essentials of education.

These two opinions seem to imply opposition if not contradiction. Thinking is put over against doing and the implication is always in evidence that if children are trained to the one the other must of necessity be excluded. But we have found that the two are only parts of the response of mind to situations that confront us. Ideas of one sort or another are gained through sense impressions, and the nervous current thus started requires an outlet, and that is action. We call the results—when the mind has done its share—experience. The trouble is that with too many the nervous paths from sense-organs lead only to blind alleys. No action follows. The emotions, started by thoughts or sense impressions, ooze away. These are the inefficient people. They mean well but do nothing. Every one knows them among acquaintances and no teacher is without them in the school. They are the children who lament their failures and are always making promises that are never kept. Among adults this state of mind affords joy to some who revel in unintelligent optimism, and pain to others who bewail their fate. Now this emotional debauchery is a habit that has been acquired through the separation of thought from action.

We are trying to find the meaning of education and we may be helped by reducing it to its lowest terms. We can then see what changes are needed as it becomes more complex.

Among the lower animals education is fully defined in terms of adaptation. No animal can live that is not adapted to its environment, and fitness to survive is all there is to animal education. But adaptation alone does not go far. If the food upon which a group of animals depends suddenly fails, the animals perish. Evidently, even among the lowest forms, ability to change, to readjust one's self to new conditions, is advantageous and, as we ascend the animal series, it becomes essential to the survival of the species. Among the lower animals, where adaptation is all there is to education, nature provides for it through instinct. These animals are endowed at birth with an almost unerring tendency to do the same thing under apparently similar circumstances. In the great majority of cases, this serves its purpose, which is preservation. It were better that fishes bite at everything offered and occasionally be caught than that they risk the loss of a meal by hesitation. Nature provides for the comparatively few fatal mistakes by making animals prolific. Twenty thousand eggs are laid by a herring and upward of sixteen million by an oyster, while the conger-eel must lay fifteen million annually to escape annihilation.\* "Certain bacteria multiply so rapidly that the descendants of a single individual, if allowed to multiply un-

**Animal education defined by adaptation**

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\* See *Lectures on the Darwinian Theory*, by C. J. Marshall.

hindered for three days, would be represented by the figures 47,000,000,000,000."\*

Adaptation meets the needs of a static environment, but for sudden change nature has made no provision. Her penalty for failure to meet the unexpected is relentless destruction, until by the slow process of bodily reorganization new organisms are produced suited to the conditions that destroyed their predecessors. This is an expensive method. It costs time and life. Now one of the aims of human education, as distinguished from animal training, should be to eliminate this waste by producing beings capable of interpreting situations and of rapid readjustment. But rapid adjustment requires ability to look at least a little way into the future, else the change is here before one is prepared.

As I write, a despatch in one of the daily papers† reports that a western county has been invaded by millions of rabbits.

"Already a district of over two hundred eighty-eight square miles has been swept clean by the pests, and the rabbits are widening out, the main army apparently dividing into two forces, one of which is invading the lands farther north, while the other is attacking the country farther west.

"The farmers of that region have been opening up a practically new country, and the loss of their grain crops leaves them facing starvation. The

\* H. W. Conn: *The Method of Evolution*, p. 53.

† *New York Times*, July 1, 1913. Unessentials omitted.

rabbits came in hordes from the region to the west, toward the Columbia River, when the tender feed began to dry up, and the young grain fields have been a luscious find for them. They cut down the stalks of grain just below the head, leaving the stubble standing.

"Authorities say that only the abolition of the coyote bounty will avail in wiping out the rabbits in that region."

This illustrates the adaptation to the static condition of which we have been speaking. The legislators and other inhabitants of that state seem to have assumed that when the coyotes were killed nature would freeze up, as it were, and changes cease. The one thing on which these people fixed their attention was that coyotes are the enemy of sheep and stock. The related and, as it appears, equally important facts—that coyotes destroy vast numbers of rabbits and so keep these little plagues in their proper place of subordination—were not considered. Yet these facts are primer knowledge to every westerner.

Of course, these people did not expect changes to end after the coyotes were gone. Put in the common vernacular, they "didn't think." If we express it somewhat more scientifically, they used the animal method, of which we have been speaking, to meet the situation. Finding that coyotes were killing sheep and stock, they took the first and easiest means of self-protection. They offered a prize in the form of a bounty for every coyote

killed. Since coyotes were numerous this bounty gave an easy livelihood to many. As a result the coyotes have passed, and with their passing has come the change that should have been foreseen.

Adaptation clearly acquires a new and wider meaning when applied to human beings. Foresee-

**Difference in meaning of animal and human adaptation** ing the future involves constructing an imaginary situation out of the materials of experience but with a different arrangement and,

perhaps, with some omissions. This is thinking things in new relations. The people, for example, of whom we spoke above, should have pictured a situation from which coyotes were missing. Then it would not have been difficult to foresee the countless increase of smaller animals that they destroy. Imagining new arrangements of materials and actions with which we are already familiar is the basis of all invention whether in thoughts or things. The aeroplane is only a new application of materials and forces which had already been used in other ways.

The trial and error method is used by man and the lower animals alike. The difference is in its

**The advantage of human imagination** application. The imagination of the lower animals is probably limited to mental reproduction of

what their senses give. It is doubtful whether, in their memory image, they can add or subtract much from the original presentation. This power to

change the picture, to see it altered by one omission after another, to imagine new situations with some of the factors in the old omitted—the ability to reduce the number of possible causes by the process of elimination—enables man to discover causes. But it is necessary to train him in its use.

A drove of sheep were being driven from one pasture to another. The foremost jumped a rail so high that it required considerable effort to make the leap. Imitation and inefficiency Soon, accidentally, one struck the rail and knocked it down. But the rest of the sheep, even to the last, gave the same leap that had been a part of the successful series of actions of those who went before. Man, also, tends to repeat the program which he has seen or learned. This is one of the factors in his inefficiency and it is with the elimination of these useless movements that the principle of scientific management is concerned. Here, again, it is a matter of trial and error joined with improved capacity to recognize success and understand its cause.

We have found that education reduced to its lowest terms is adaptation to environment. As animals become more complex ability to foresee changes and to plan for them is added. Adaptation is then directed by intelligence and the old primitive trial and error method acquires new significance. Training for this higher mode of adaptation, and



practice in it, are essential parts of the education of children. It was for this that man's longer period of infancy was given.

The committee in charge of the Portland school survey laid down three fundamental working principles which are as true for **The school and community** schools in other sections of the country, and for small and large towns alike, as they are for Portland. "First, the children and youth of the community must be constantly and sympathetically studied by teachers and principals, in order that these may understand at all times the condition, the capacity, the interests, and the educational needs of each child or youth.

"Second, the various present and prospective opportunities and needs of the community for worthy service must also be studied, constantly and appreciatively, particularly by those immediately responsible for the education of youth soon to be called upon to take effective part in the occupations and life of the community."

It is interesting, in this connection to read in the Carnegie Foundation's report on Vermont that "Something is radically wrong with a school in an agricultural community that develops motormen, stenographers, and typewriters, and fails to develop farmers, dairymen, and gardeners."

"Third, the instruction of each child and youth—the content, method, and the immediate purpose of that instruction—must be constantly adapted to

the needs of that child or youth, in the light of the needs of the community."

Change characterizes the present. Inventions are so frequent that manufacturers find difficulty in meeting the expense of introducing them, and railway companies are continually obliged to reconstruct or discard cars and make over their road beds. A battle-ship, with its tremendous cost of five million dollars or more, is obsolete in about ten years and practically worthless for its purpose a little later. The automobile has made necessary an entirely new science of road building, and the farmer who a few years ago was able to make a good living by merely hard work is no longer able to compete with those who foresaw the change and availed themselves of scientific methods. Even the rotation of crops which not long ago was regarded as the acme of the science of farming is now compared by one expert to the effect on a bank-account of rotating a check book among different members of the family.

The changes that are going on with such amazing rapidity call for correspondingly rapid readaptation of those who wish to succeed. But the period of accelerated progress came upon us so unexpectedly that we have not yet succeeded in adjusting ourselves to it. How sudden has been the change the apprentice life of men still in active business shows. When they were boys conditions

**Success dependent on rapid readaptation**

were comparatively stable. A son expected to follow in his father's business, or, if not, he learned a trade or selected some other occupation suited to his taste. Permanency and stability were always counted on. But how quickly was he undeceived. Perhaps, with meager ability, little schooling and parental demand for financial aid, he learned the trade of making shoes. We know the disappointment of those who did. It was not long before machinery drove them out of business. To-day, they cobble and find it difficult to live. Resoling shoes with the electric hammer has greatly reduced their income.

Some time ago the writer made the acquaintance of a machine and implement maker who learned

his trade when skilled hand workmen were in demand. To-day the university laboratory is the only place where he can find employment. But laboratories large enough to employ a skilled mechanic are not numerous, so most of those who learned this trade have been forced into other occupations.

We are all familiar with the change which the mail-order houses and trolley lines have brought on the general country stores.

These are a few of the instances which might be cited to show the trend. Apparently the only certainty to-day in trades or business is their uncertainty. And those who are to succeed must be prepared for change, since there is abundant ground

## LEARNING BY DOING

the belief that industrial reconstruction has only  
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The significance of this for the schools is evi-  
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two interdependent institutions  
w up together their points of contact adjust  
nselves to each other. For this reason the  
ie and school of fifty years ago fitted nicely into  
industrial conditions of the period. This is  
phase of nature's law of adaptation. She is  
concerned with the final outcome. One result  
sifies her as well as another. But things must  
k. If they do not the system is unstable and  
rations of one sort or another will occur until  
workable relationship is found. Public school  
ems, for example, owe their origin to the in-  
ent demand for industrial equality, because de-  
cracy and the education of a selected few could  
come to a working agreement. As long as  
ange is slow, adjustment keeps pace, but when  
part of the social organization outstrips another,  
fusion arises and continues until a new state  
equilibrium is finally established. After that  
ustment must begin anew. To-day we are pass-  
through such a period of readjustment on ac-  
nt of the revolutionary social and industrial

changes of the last few decades. Home life has undergone a transformation with which the school has not kept pace.

If the training for the business of life by the home is possible to-day the difficulties in its way are so great that few parents will overcome the resistance. Easy access of the country boy to the dissipations of the town, tenement life among the city poor, apartment-house life with the well-to-do and the high pressure social life of the rich are not conducive to training for successful manhood and womanhood. Of course it can be done, but constant effort to overcome obstructions is difficult and man finally settles down to the laissez-faire attitude and education becomes a matter of the play of chance forces of the environment.

It is useless to attempt to limit and define the responsibility of the factors contributing to education. We are dealing with a situation, and if the homes fail to meet it the schools must. Besides, education is the business of the teacher. The belief that duty ends with the instruction in the three R's is very modern. In the colonial days the schoolmaster was second only to the preacher as guide and friend. To-day there is more reason for the teacher to assume this function than in earlier times, because the home has lost much of

**Difficulty of  
modern home in  
training for life**

**Task of schools  
to supplement  
failure of home**

its machinery for the training of children. But let us see the sort of development which parents unconsciously gave their children fifty years ago.\*

"I begin with winter, when men's industries were most diversified, and largely in wood," says G. Stanley Hall, speaking of his boyhood days. "Lumber—or timber—trees were chopped down and cut by two men working a cross-cut saw, which was always getting stuck fast, in a pinch which took the set out of it, unless the whole trunk was pried up by skids. Sometimes the fallen trees were cut into logs, snaked together and piled with the aid of cant-hooks, to be drawn across the frozen pond to the saw-mill for some contemplated building, or, if of spruce, of straight grain and few knots, or of good rift, they were cut into bolts, or cross-sections fifteen inches long, which was the legal length for shingles. These were taken home in a pung, split with beetle and wedge, and then with a frow, and finished off with a drawshave on a shaving-horse, itself home-made. . . . Axes, too, were sawn, split, hewn, whittled, and scraped into shape with broken glass, and the form peculiar to each local maker was as characteristic as the style of painter or poet, and was widely known, compared and criticized. Butter-paddles were commonly made of red cherry, while sugar lap paddles

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\* *Boy Life in a Massachusetts Country Town Forty Years Ago*, by G. Stanley Hall. *Pedagogical Seminary*, Vol. 13, p. 192

were made by merely barking whistle wood or bass and whittling down one end for a handle. Mauls and beetles were made of ash-knots, ox-bows of walnut, held in shape till seasoned by withes of yellow birch, from which also birch brushes and brooms were manufactured on winter evenings by stripping down seams of wood in the green. There were salt mortars and pig-troughs made from solid logs, with tools hardly more effective than those the Indian uses for his dug-out. Flails for next year's threshing, cheese-hoops and cheese-ladders; bread-troughs and yokes for hogs and sheep, and pokes for jumping cattle, horses and unruly geese, and stanchions for cows. . . . Repairs were made during this season, and a new cat-hole beside the door with a lateral working drop-lid, which the cat operated with ease, was made one winter."

All of these activities the boys saw and helped in according to their age and strength. The work presented obstacles to be overcome and problems to be solved which called for thinking. It was training to do things by doing them; and one of the duties of educators to-day is to find an adequate substitute for the home training of this earlier period.

Closely connected with the life of the boys of that day were the "hemlock bows and arrows, or cross-bows, with arrow-heads run on with melted lead (for which every scrap of lead pipe or antique pewter dish was in great demand) often fatal

for small game; box and figure 4 traps for rats and squirrels; wind-mills; weather-vanes in the form of fish, roosters or even ships; an actual saw-mill that went in the brook, and cut planks with marino and black and white Carter potatoes for logs; and many whittled tools, toys and ornamental forms and puppets. . . . How much all this has saved me since, in the laboratory, in daily life and even in the study," continues Doctor Hall, "it would be hard to estimate.

"I must not forget the rage for trapping and hunting, by which we learned much of the habits of crows, hawks, muskrats, woodchucks, squirrels, partridges and even foxes, and which made us acquainted with wide areas of territory. . . . We (the younger boys of about ten) made collections for the whole season, of wood, leaves, flowers, stones, bugs, butterflies, etc."

Broom making, with its preliminary planting, breaking, tabling and hatcheling, watching the local tanner, gunsmiths and basket makers, visiting the cooper-shops, carding mills, hovering around the turning shops to see how they made wooden spoons, bowls, etc., not to mention the blacksmith shops, harness makers and shops in which shoes were made and not merely cobbled, all of these places and many more helped along the education of the New England boys fifty years ago. "I know," says Doctor Hall, that "I could make soap, maple sugar, a pair of



shoes, braid a palm leaf hat, spin, put in and weave a piece of frocking or a rag carpet.

"The dull days in haying time brought another sort of education. The men of the vicinity strolled together in a shed, and, sitting on a tool bench, grindstone, manger, wagons, chopping blocks, and hog spouts, discussed crop prices, ditching, walling, salting cattle, finding springs with witch hazel, taxes, the preaching," etc., all of which afforded training in common-sense philosophy, economics and citizenship.

In the evening, as the family gathered around the stove, or the old fireplace, stories were told and books were read. "A pair of skates was earned by a boy friend one winter by reading the entire Bible through, and another boy bought an accordion with money earned by braiding the plain sides of palm-leaf hats where no splicing was needed, for women at a cent per side."

The farm in those days was a great workshop and laboratory surrounded by a limitless range of fields and woods peopled with innumerable wild animals waiting to be watched or caught. It was admirable training for the life of the period and not so bad for present needs could we but imitate its spontaneity.

The life of the boy to-day compared with the freedom to construct, to plan, to think and grow

**Failure of modern substitute for farm** in those earlier days is like that of the wild beast in captivity. To be sure we have been trying lately to supply the need, but our efforts have been hardly more successful than the "jungle" in the New York Zoological Garden by which it was thought to woo the snakes of southern swamps. And yet this variety of activity is more necessary to-day than in former times because of the constant need of readjustment to changing conditions. The best way to make adaptable, versatile men is to make constructive, creative boys.

We have said that the present age is characterized by change. Trades, when not abandoned, are in a continual state of alteration. The great majority of the boys who go out from the schools must find their livelihood in some of the modest occupations from which we have drawn examples. But let us see if the situation is different higher up.

The president and general manager of a large electric manufacturing company recently told the **Facts about business failures** writer that his business is changing and expanding so fast that his greatest difficulty consists in finding among the thousand in his employ men who are qualified for the various grades of subordinate executive responsibility. "The fundamental limitation of the majority of men, from the standpoint of availability for promotion, consists," he said, "in lack of capacity to adjust themselves to new requirements.

“Modern business,” he continued, “no longer waits for men to qualify after promotion. Through **Imagination and business** anticipation and prior preparation every growing man must be largely ready for his new job when it comes to him. I find very few individuals making any effort to think out better ways of doing things. They do not anticipate needs, do not keep themselves fresh at the growing point. If they ever had any imagination they seem to have lost it and imagination is needed in a growing business, for it is through the imagination that one anticipates future changes and so prepares for them before they come. Accordingly, as a general proposition, the selection of a man for a vacancy within the organization is more or less a matter of guesswork. Now and then an ambitious, wide-awake young man works into the organization and in a very short time is spotted by various department managers for future promotion, but the number of such individuals is discouragingly small. The difficulty with which we are always confronted is that our business grows faster than do those within it. The men do not keep up with our changes. The business grows away from them and quite reluctantly the management is frequently compelled to go outside for the necessary material. We need, at the present time, four or five subordinate chiefs in various parts of the factory and I can fill none of them satisfactorily from material in hand.”

When questioned further, this same man said, "Capacity to vary and rapidly to readjust one's self to new and changing conditions is not only essential to the business success of individuals but it is quite as necessary with respect to the business itself." He then instanced several companies which ten years ago were the leaders in their lines but which have fallen far behind because of the inability of the management to anticipate the future and to make the necessary readjustment. One of these companies did not see the significance of the revolutionary advent of the steam turbine. "The management sat by while other companies brought it to a successful commercial basis. There is no standing-still in the business world to-day. Methods, devices and social tendencies in general, demand a constant evolution upward in human capacity all along the line."

The manager of a company that sells heaters through a large part of the United States writes that when he assumed control he secured as agents men who had been successful in selling other lines of goods. He reasoned that selling goods was much the same whatever the commodity. In any line of salesmanship the agents must learn to meet and deal with men and the readaptation necessary with the change of article would be comparatively easy. So he thought it out. But to his amazement he found

that the men whom he employed could not make even this slight readjustment. An entire year was lost by the company in getting started.

This manager mentioned an instance of incapacity for readaptation of a different sort from those to which we have referred. "A man who had formerly held a railroad position in which he had been obliged to deal with men and convince them of the value of his propositions undertook to sell heaters to school boards. He was an unusually 'good mixer.' He made friends easily and kept them; but he could not handle school boards. This man, after trying all summer, with a wide experience in dealing with men, was wholly unable to meet a situation and adjust himself to it. At the end of the season he gave it up.

"There is no question in my mind," continues this manager, "that mental flexibility is absolutely essential to a young man who expects to become active in the business world. Business is made up of constantly changing conditions and unexpected situations. One who can not see ahead and have a plan for a new situation before it comes had better stay out. Every business day is apt to bring the unexpected, and the man who is not ready, who has not the resourcefulness to adjust himself to new conditions, is eventually a failure. The man who is mentally flexible and who studies the situations and looks into the future is a success."

The assistant manager of the system of street railways in one of the three or four of our largest cities writes as follows: **Problems of big business concerns** "All large employers of labor need foremen and, in factories or other industries, departmental heads. It is desirable that these foremen be not only well grounded in the particular work which they supervise, but they should, in addition, have some executive ability. Since few men are versatile enough or sufficiently equipped for the work many large companies have training schools in which instruction is freely given to the employees who desire to avail themselves of the opportunity. The hope is that from among the many who take the instruction a sufficient number will develop the versatility necessary for some of the executive positions.

"Another problem which employers of large numbers of men must meet is to keep good men. An employer can not afford to be continually breaking in a wholly new outfit of men. There must be some permanency to his organization. This is one of the cases in which the manager must be versatile. To meet this need the following plans have been put into effect by many of the large employers of labor. (1) A purchasing system; (2) an employees' relief association which furnishes medical and hospital attention to sick employees; (3) a cooperative purchasing system by means of which employees have the benefit of the purchasing

power of a large corporation; (4) a loan department; (5) a legal department; (6) entertainments, such as baseball teams, basket-ball teams, dances, amateur vaudeville, bands, orchestras, glee clubs, picnics, etc. The company which I represent has in operation all of these except the relief association and the purchasing department. These matters have been under consideration for some time and it is probable that in the near future the plans will be put into effect. We have built a large entertainment hall which is free for the use of our employees.

"A street railway system, like all other modern business, is constantly changing. New problems are continually arising and the old ones never die. Among those with which we are always confronted are problems in car construction, with improvement in electric motors and railway trucks, changes in track construction, which involve improvement in paving material and new kinds of road beds together with a complete revolution in the method of track laying. These are only illustrations of the changes that are always going on. Many more might be named."

One of the partners in a large wholesale grocery house also writes that changes and readjustment of

**Changes in whole-** one sort or another are continu-  
**sale grocery** ally forced on his firm. A large  
**business** number of commodities which  
 formerly were among their "best sellers" have been  
 taken from them and are now sold directly to the

consumer by the importers or manufacturers. To offset this loss the wholesale grocer has been obliged to add articles which, a few years ago, were handled exclusively by wholesale dry-goods houses and by drug and hardware firms. "To name only a few items, cotton gloves, hosiery, spool cotton, stable drugs, patent medicines, ammunition, nails, wire and even sewing-machines are sold by the wholesale grocer." The fact that the coffee, tea and spice business has in a large measure been taken away from the wholesale grocer, that sugar refineries and tobacco companies are selling their goods directly to the retailer, and that manufacturers are more and more eliminating the wholesaler "has brought about the curious result that the wholesale grocer now carries a greater variety of other goods than he does of groceries." All of these changes naturally deprived wholesale grocers of commodities with the details of which they were familiar, and compelled them to investigate and find a market for other articles to take their place.

Again, in earlier years, the purchaser sought the seller, now the seller must seek the purchaser. As a result of this the jobber "no longer owns his trade. This is in a real sense the personal property of the salesmen who take their customers with them when they change from one wholesale house to another." In this way a jobber may lose an entire territory in a day and then he is confronted with the problem of regaining it or of finding a



new territory to take its place. "The difficulties of winning back the customers who have been taken to another house are usually insurmountable because, while formerly the relation between the jobber and retailer was a close and personal one, to-day they are unacquainted."

The changes in the woodenware business are startling in their explosive swiftness. The following letter from the senior member of one of the largest companies shows how truly "eternal vigilance is the price of profits."

"Thirty years ago," the writer says, "when I entered the woodenware business it was strictly a jobbing proposition, selling to both wholesalers and retailers. Our trade was largely in items of wood together with many small articles known as 'Yankee notions,' and brooms, the last of which was one of our most important articles. This continued for about twenty years, when a merry run of business changes began. First, the wholesalers throughout the country took the position that if we sold to them we must not sell to the retail trade. After five years of struggle we yielded. Then five years later the wholesalers cut us out of their business entirely and began to buy directly from the factory.

"Although we had never engaged in manufacturing we now saw that we must make that change or be left behind. Now, starting factories for many articles is expensive business. So we tried to look

into the future and see which of our articles had the best prospects. Finally we selected several, among which were paper bags and galvanized iron tubs and pails that were then just beginning to replace the wooden articles. As a result of manufacturing paper bags our sales in this item alone increased more than twelve times.

"School slates, a large item in our business, gave way to paper tablets which we were forced to manufacture. Our sales of this one article now amount to about \$200,000 annually.

"These are only a few of the many changes that are in continual progress. Business is never stationary. When it is the end is near. We must constantly watch the market and try to discover a little of what the future is sending us. If we fail in our interpretation more versatile men get the business."

These illustrations are probably enough to establish the truth of the statements, a few pages back, that change is the order of the day and that the only certainty in business is its uncertainty.

"Efficiency" and "scientific management," so much talked of to-day, originated in the need for industrial readjustment of which we have been speaking. The simplest plan, when a manufacturer finds it necessary to reduce the cost of making his product, is to lower wages. This requires no intelligence and for that reason is the common

**How scientific  
management  
works out**

method. Taylor, however, has found\* that efficiency, which is synonymous with low labor cost, pays higher wages, and the investigations of N. I. Stone, formerly Chief Statistician of the Tariff Board, support this view. "Almost invariably the (woolen) mills paying higher wages per hour showed lower costs than their competitors with lower wages. Thus, in wool scouring the lowest average wages paid to machine operatives in the thirty mills examined was found to be 12.16 cents per hour, and the highest 17.79. Yet the low wage mill showed a labor cost of twenty-one cents per hundred pounds of wool, while the higher wage mill had a cost of only fifteen cents per hundred."† Again, "in the carding departments of seventeen worsted mills, the mill paying its machine-operatives an average wage of 13.18 cents per hour had a machine labor cost of four cents per hundred pounds, while the mill paying its machine-operatives only 11.86 cents per hour, had a cost of twenty-five cents per hundred pounds."

Even more astounding was the inefficiency found in the carding departments of twenty-six woolen mills. "The mill with the highest machine output per man per hour, namely 57.7 pounds, had a machine-labor cost of twenty-three cents per hundred pounds, while the mill with a machine output of only six

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\* *The Principles of Scientific Management*, by Frederick W. Taylor.

† *Century Magazine*, Vol. 86, May, 1913, p. 113.

pounds per operative per hour had a cost of \$1.64 per hundred pounds. Yet this mill, with a cost seventeen times higher than the other, paid its operatives only 9.86 cents per hour, as against 13.09 cents per hour paid by its more successful competitor."

Taylor found on investigating the unscientific act of shoveling that the same shovel was used for iron ore as for rice coal. In **A result of inefficient method** the former case the workmen shoveled a load of thirty pounds and in the latter four pounds, an absurdity on the face of it. Yet this inefficient method had been employed for years without attracting the attention of the foremen or of the educated managers in the office.

The result of Taylor's reorganization of the ways of doing things in the Bethlehem Steel Company was a saving during the first year **A result of scientific management** of \$36,417.69 and during the six months following, "the saving was at the rate of between \$75,000 and \$80,000 per year"; and the workmen were earning higher wages.

Whatever else may be included in the meaning of efficiency it is evident from the concrete evidence on every side that **Education for efficiency** versatility—capacity for new adaptations and the ability to see a little way ahead and to employ one's knowledge in solving problems that arise—must not be omitted. The really needful thing is to train children to be efficient rather than

to find jobs for them for which they are not fitted. This is the way in which the Commissioner summarizes a recent report on vocational training\* published by the United States Bureau of Education.

As to the method of training for efficiency, the way is not so uncertain if we may judge from the **Successful** human documents, given in the **methods** first chapter, of the men who have tried to analyze their boyhood feelings, and from the experimental organizations for group-work which have been cited. The motive power is given in the racial impulses which drive children with irresistible force to action. The problem is then simplified. The teacher does not need to create interest in the work. Enough enthusiasm is present in every school to furnish power to run a hundred educational plants. The teacher's function is to divert this flow of racial energy into social and industrial channels. How this may be done has been indicated by the experiments of earlier chapters. We have seen that children want to do things for themselves. What they do and what they manage does not matter much as far as the available energy is concerned. They must feel, however, that the work is theirs, that they are responsible for it and that the glory of its success is theirs.

In striving to produce versatility, however, it is

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\**Vocational Education Survey*, by Miss Alice B. Barrows, Bureau of Education, 1913.

important that children engage in activities which have not been mechanized with rules. This is pioneering and pioneers work their way through unknown obstacles overcoming difficulties as they arise. Under these conditions real problems exist—problems that relish because no one, not even the teacher, knows the solution. The uncertainty of such problems or situations gives the flavor of adventure which answers a call of youth and awakens zeal for achievement. The problems of the school are usually artificial constructions. The children are aware that the teacher knows their solution and this deprives them of the impelling force that incites to action in the real difficulties of the outside world. In earlier chapters we have shown how some teachers have tried to produce living problems in their school.

This gives the cue for making children intelligent, constructive workers instead of submissive followers. Versatility and efficiency are not the offspring of imitation. Originality and efficiency is needed and this quality of mind is acquired only in an environment that encourages its growth. The crude matrix from which initiative may develop we have found in the instincts for group-action, workmanship and planning, but their application to social ends must be learned by the individual through acts stimulated by his desire to work out definite social projects. Contriving conditions which shall inevitably arouse

in children the impulse to meet difficulties by plans which they themselves originate raises teachers to their proper sphere of action, that of guide and helper instead of driver.

Children, in managing situations thus created, are learning to interpret conditions that arise and

**Conclusion** are developing a versatility that prepares them to meet similar problems in the larger outside world where experience is dearer and failure more disastrous. In a school thus organized the pupils are dealing with situations of actual life instead of with the artificial conditions fabricated by traditional pedagogy. They learn to devise ways and means of overcoming obstacles and they profit from their mistakes. This is training in versatility, and it is quite different from having the school life laid out in assignments, rules and prohibitions. According to the usual method the teacher plans the work and the pupils regulate the amount of energy they put into it with marvelous nicety by the "passing mark." This is the most prominent standard of excellence and so the children adapt their attainments to it. The stimulus for a high grade of efficiency, which we have found in organized group-work, is absent. There is no incentive to versatility because conformity to the common type is popular. Whatever intellectual competition there may be is on a low level and mediocrity is not a stimulating environment for the production of versatile minds.

When, on the other hand, schools are organized into groups of pupils banded together for purposes which the children themselves have conceived, with the aid of tactful suggestions from their teachers, they are alert to excel, to produce something new, to be different from their fellows. This is a fertile environment for versatility and efficiency. Each one has a plan to offer to meet the difficulties that arise in achieving what they have set themselves to do. The enthusiasm of the many stirs the few laggards. Laziness is at a discount and work at a premium. The children learn by doing because those who accomplish things are held in high esteem among their companions. The standard to which the pupils make their adaptation is achievement which never lets them rest satisfied. The customary method seeks to train children for adult life. The plan here urged trains them in living while they are yet in school.

THE END



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